



**City of Bellevue  
Development Services Department  
Land Use Staff Report**

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**Proposal Name:** Lu Residence

**Proposal Address:** 13632 SE 37<sup>th</sup> Street

**Proposal Description:** The applicant requests a Critical Areas Land Use Permit to modify a critical area steep slope fifty foot (50') top of slope buffer, to allow for the construction of a new single family dwelling. The proposal includes 1,391 square feet of buffer mitigation with native steep slope buffer planting. The proposal is supported by a Critical Areas Report.

**File Number:** 18-129010-LO


**Applicant:** Nicole Mecum – Encompass Engineering & Surveying

**Decisions Included:** Critical Areas Land Use Permit  
(Process II. LUC 20.30P)

**Planner:** Laurie Tyler, Senior Planner

**State Environmental Policy Act  
Threshold Determination:** **SEPA Exempt per WAC 197-11-800**

**Director's Decision:** **Approval with Conditions**  
Michael A. Brennan, Director  
Development Services Department

By:   
Elizabeth Stead, Land Use Director  
Development Services Department

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Application Date:	October 26, 2018
Notice of Application Publication Date:	December 6, 2018
Decision Publication Date:	June 27, 2019
Project Appeal Deadline:	July 11, 2019

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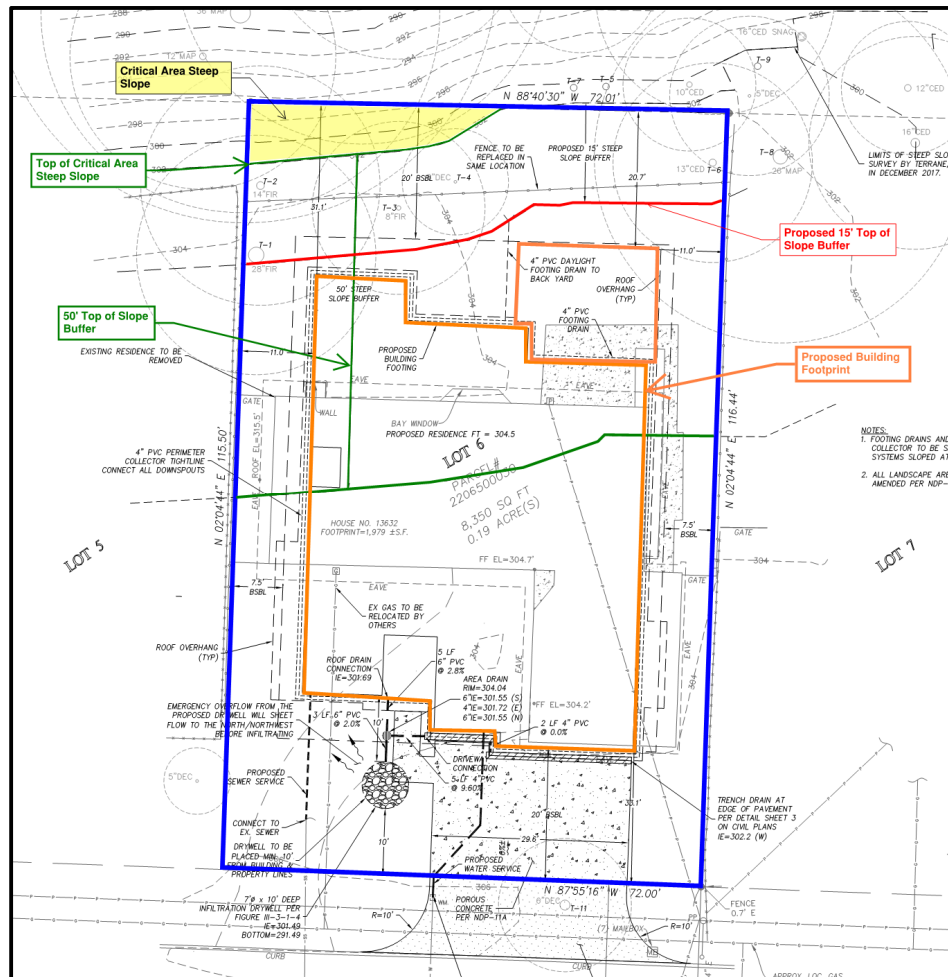
For information on how to appeal a proposal, visit Development Services Center at City Hall or call (425) 452-6800. Appeal of the Decision must be received in the City's Clerk's Office by 5 PM on the date noted for appeal of the decision.

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### **Attachments**

1. Site Plan
2. Critical Areas Report & Buffer Mitigation Plan – Wetland Resources, Inc.
3. Geotechnical Report - Migizi



Proposals to permanently modify a steep slope buffer require the approval of a Critical Areas Land Use Permit (CALUP) with a Critical Areas Report (CAR), and are subject to the requirements of LUC 20.25H and 20.30P, including but not limited to those sections governing steep slopes, Critical Areas Reports (CAR), and mitigation.

## B. Review Process

A Critical Areas Land Use Permit is a Process II application (LUC 20.35.200) with an administrative decision by the Director of Development Services (LUC 20.30V). Any appeal of a Process II decision is heard and decided upon by the City of Bellevue Hearing Examiner.

## II. SITE DESCRIPTION, ZONING, LAND USE AND CRITICAL AREAS

### A. Site Description

The subject site is located south of Interstate 90 in the Eastgate subarea. The property is 8,350 square feet (0.19 acres) in size and is approximately 72-feet wide by 116-feet deep. Site topography is relatively flat, with the exception of the area on the north end of the property, which steeply descends to the north onto the adjacent office property. The site is currently improved with an existing single-family dwelling that is proposed to be demolished to construct a new single-family dwelling on the site.

**Figure 2 – Aerial Map of Subject Site**



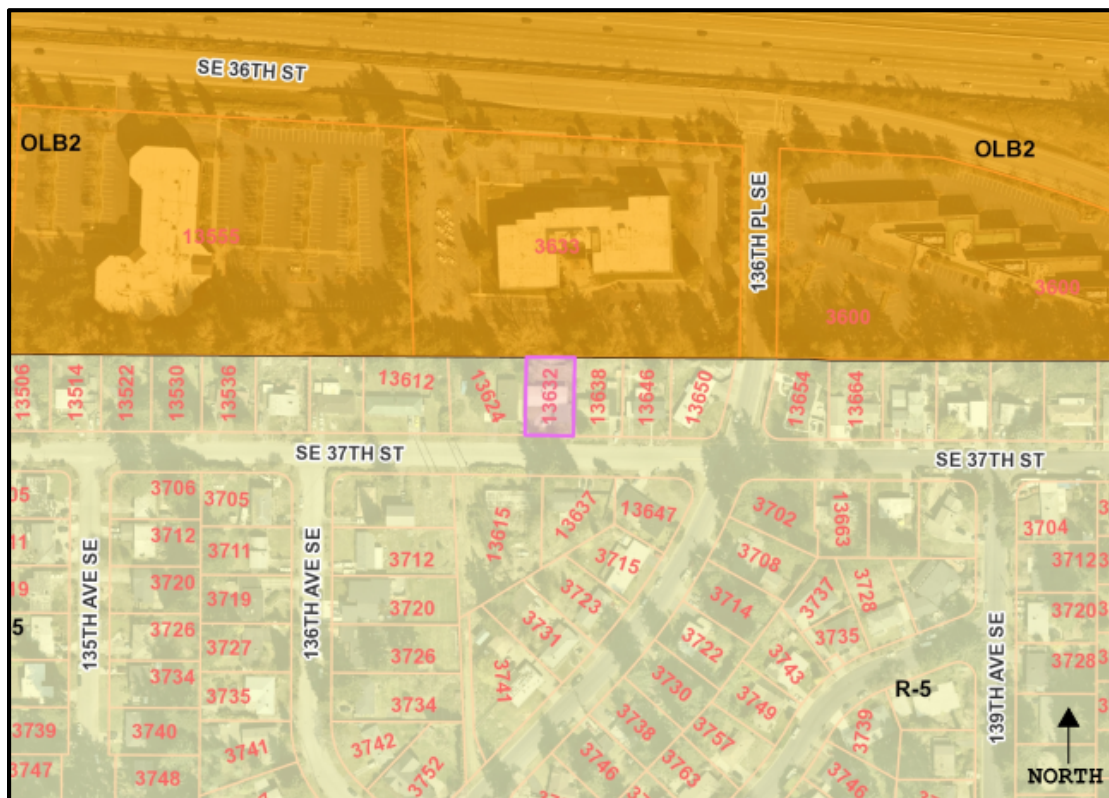
Critical areas exist on this site, as identified by the geotechnical report prepared by Migizi Group, Inc. dated March 8, 2018. In its report, Migizi identified a steep slope along the northern property boundary, between the existing single family dwelling and the commercial office surface parking area to the north. Topographically, the project site is relatively level, with minimal grade change being observed over its extent. However, the transition between the project area, adjacent residential sites, and the commercial complex to the north is marked by a 15-foot high slope, which contains localized gradients of +/- 50%. A copy of this geotechnical report can be found as Attachment 3.

The steep slope is currently vegetated with various evergreen tree species and some understory plantings, some of which are invasive species such as Himalayan blackberry. Below the slope, the property to the north is currently improved with an existing surface parking area, and commercial office building beyond.

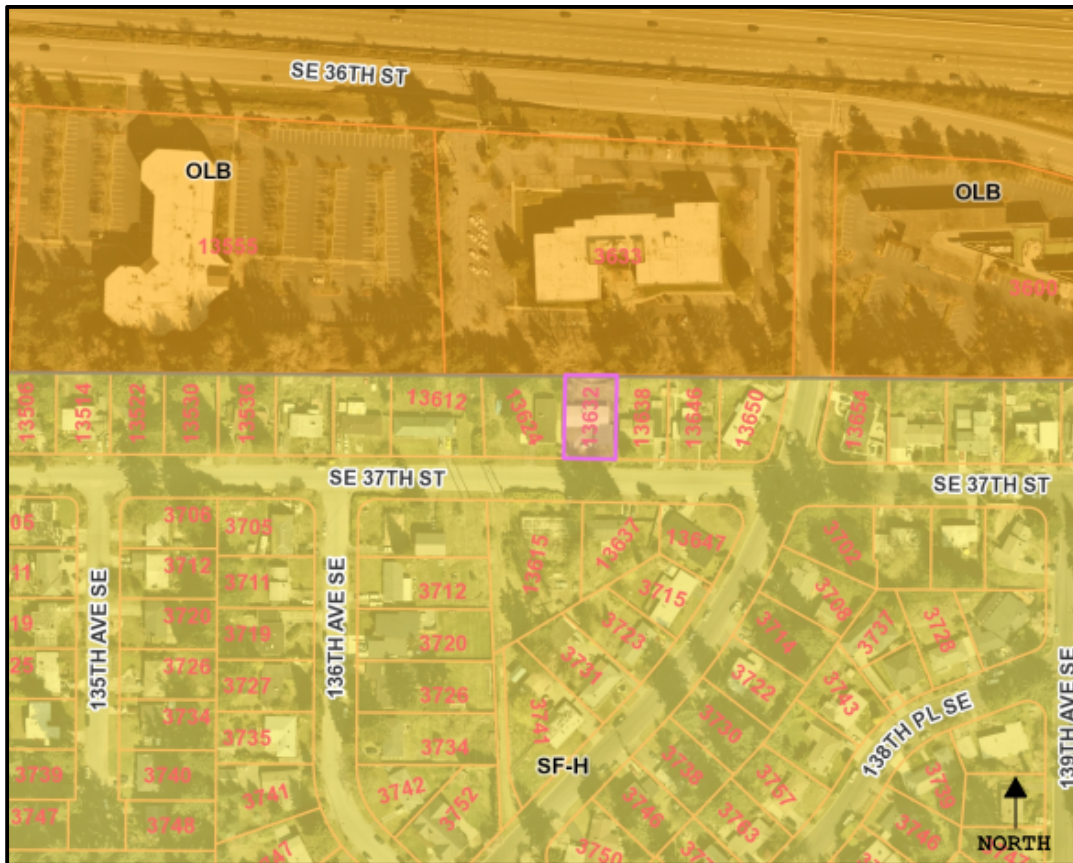
## B. Zoning and Land Use Context

The subject site is zoned Single-Family Residential (R-5) and is located within the Eastgate Subarea. The property has a Comprehensive Plan designation of Single-Family – High (SF-H) density. The site is surrounded by single-family dwellings to the east, west and south, and an office development to the north.

Figure 3 - Zoning Map



**Figure 4 – Comprehensive Plan Map**



## **C. Critical Areas Functions and Values**

### **i. Geologic Hazard Areas**

Geologic hazards pose a threat to the health and safety of citizens when commercial, residential, or industrial development is inappropriately sited in areas of significant hazard. Some geologic hazards can be reduced or mitigated by engineering, design, or modified construction practices. When technology cannot reduce risks to acceptable levels, building in geologically hazardous areas is best avoided (WAC 365-190).

Steep slopes may serve several other functions and possess other values for the City and its residents. Several of Bellevue's remaining large blocks of forest are located in steep slope areas, providing habitat for a variety of wildlife species and important linkages between habitat areas in the City. These steep slope areas also act as conduits for groundwater, which drains from hillsides to provide a water source for the City's wetlands and stream systems. Vegetated steep slopes also provide a visual amenity in the City, providing a "green" backdrop for urbanized areas enhancing property values and buffering urban development.

### III. CONSISTENCY WITH LAND USE AND CRITICAL AREAS CODE REQUIREMENTS

#### A. Land Use District Dimensional Requirements

The site is located in the R-5 land use district. The plans submitted generally demonstrate conformance with these standards. However, as part of the building permit, the applicant will be required to comply with all applicable Land Use Code standards prior to City approval. The following have been reviewed and confirmed under this application:

Basic Information			
Zoning District	R-5		
Gross Lot Area	8,350 square feet (0.19 acres) Critical Area = 250 SF		
Dimensional Requirement	Requirement	Proposed	Land Use Code 20.20.010
Front Yard Structure Setback (feet)	20 Feet	20 Feet	Meets Land Use Code
Rear Yard Structure Setback (feet)	20 Feet	26 Feet	Meets Land Use Code
Side Yard Structure Setback (feet)	5 Feet 2 Side Yards = 15 Feet	7.5 Feet 15 Feet	Meets Land Use Code
Maximum Lot Coverage (percent)	40%	2890 SF 36%	Meets Land Use Code
Maximum Impervious Surface (percent)	55%	3,924 SF 47%	Meets Land Use Code
Minimum Greenspace (percent)	50%	842 SF 50%	Meets Land Use Code
Minimum Tree Retention	30%	100%	Meets Land Use Code

#### B. Critical Areas Requirements LUC 20.25H: Consistency with Land Use Code Critical Areas Performance Standards for Steep Slopes – 20.25H.125.

In addition to generally applicable performance standards set forth in LUC 20.25H.055 and 20.25H.065, development within a landslide hazard or steep slope critical area or the critical area buffers of usch hazards shall incorporate the following additional performance standards in design of the development, as applicable. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function.

- **Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;**

Response: *The proposed redevelopment of the site, which includes demolition of an existing structure and construction of a new single family home, are located outside of the critical area steep slope. The proposed structure will encroach into the prescribed 50-foot top of slope buffer a distance of 35 feet. No alternations to the natural contour of the slope are proposed.*

- **Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;**

Response: *The proposed redevelopment of the site will utilize previously developed areas to the greatest extent possible, and will have no impact on the area of steep slope. The project will impact the buffer area, which has been previously disturbed and graded to accommodate the existing residence and maintained lawn/landscaping. No natural landforms or vegetation will be impacted.*

- **The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;**

Response: *As discussed in the Geotechnical Report, prepared by Migizi Group Inc., dated March 8, 2018, the proposal will not result in greater risks or a need for an increased buffer on neighboring properties. During reconnaissance of the site, no irregularities indicating slope failure were observed within the steep slope region (off-site). It is their conclusion that this region is currently in a stable configuration, and minimal buffers and/or setbacks need to be implemented to address the steep slope hazard. The property owner will be required to execute a Hold Harmless Agreement, releasing the City from liability for any improvements within the critical area or critical area buffer. **Refer to Section X for Conditions of Approval regarding Hold Harmless Agreement.***

- **The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall;**

Response: *No retaining walls or artificially graded slopes are proposed for this project*

- **Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer;**

Response: *No new impervious surface is proposed within the on-site steep slope area located in the north-west corner of the property. Within the 50-foot top of steep*

*slope buffer, new impervious surface is minimized by utilizing the existing footprint of the original structure. 779 square feet of the newly proposed structure is sited over existing impervious surface, and 785 square feet of the new structure would be new impervious surface disturbance within the prescribed buffer.*

- **Where change in grade outside the building footprint is necessary, the site retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with this criteria;**

Response: *Grading is not proposed within the on-site steep slope, nor is a change in grade proposed outside of the building footprint for the proposed new single-family dwelling.*

- **Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation;**

Response: *Retaining walls, rockeries and other retaining structures are not required or proposed for this project.*

- **On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification;**

Response: *No construction or disturbance is proposed within the on-site steep slope area.*

- **On slopes in excess of 40 percent, pile deck support structures are required where technically feasible for parking or garages over fill-based construction types; and**

Response: *Not applicable as this proposal is not for parking or a parking garage.*

- **Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210.**

Response: The applicant submitted an arborist report, dated May 9, 2019, prepared by Neal Baker, arboristsNW, LLC, which analyzed the proposal for any significant permanent impacts to the existing critical root zones and canopies, both on-site and off-site. Arborist has provided specific recommendations where the proposal does not meet the minimum critical root zone requirements as specified in Clearing & Grading BMP T101, in order to ensure survival of significant trees on-site adjacent to proposed

development. Conformance with the arborist recommendations will be required at the time of Building Permit review and during construction. **Refer to Section X for Condition of Approval regarding Arborist Report Recommendations.**

*In addition, a restoration and enhancement planting plan has been prepared for both permanent and temporary disturbance impacts within the small critical area steep slope area and top of slope buffer. The proposal would impact 1,378 square feet of the critical area steep slope and buffer. The restoration and enhancement plan indicates 1,391 square feet of enhancement plantings to mitigate for this disturbance, within both the on-site steep slope and buffer areas. The species and densities provided in the plan generally conform to the requirement of the City's Critical Areas Handbook, and the application will be required to provide a final mitigation planting plan under the Building Permit application. Conformance with the City's Critical Areas Handbook will be determined at the time of Building Permit review. **Refer to Section X for Conditions of Approval regarding Mitigation Plan.***

#### **C. Consistency with Critical Area Report LUC 20.25H.230**

The applicant supplied a complete critical areas report, prepared by Wetland Resources, Inc., a qualified professional, which included a geotechnical analysis, prepared by Migizi Group Inc. This critical areas report meets the minimum requirements in LUC 20.25H.250.

#### **IV. PUBLIC NOTICE AND COMMENT**

Application Date:	October 26, 2018
Public Notice:	December 6, 2018
Minimum Comment Period:	December 20, 2018

The Notice of Application for this project was published in the City of Bellevue Weekly Permit Bulletin and Seattle Times on December 6, 2018. It was mailed to property owners within 500 feet of the project site. No comments have been received from the public as of the publication of this decision.

#### **V. SUMMARY OF TECHNICAL REVIEWS**

##### **A. Clearing and Grading**

The Clearing and Grading Division of the Development Services Department has reviewed the plans and materials submitted for this project and has approved the clearing and grading portion of this land use application. The future clearing and grading permit application for this development must comply with conditions of approval for this permit and City of Bellevue Clearing and Grading Code (BCC 23.76). **Refer to Section X for Conditions of Approval regarding Geotechnical Review and Geotechnical Inspection.**

## **B. Utilities**

Storm Drainage – This project conforms to the 2014 Department of Ecology Stormwater Management Manual for Western Washington and meets stormwater requirements of the 2018 City of Bellevue Surface Water Engineering Standards. The proposed storm water management for the new development is compliant with storm water minimum requirements 1-5. The project will maintain natural drainage patterns and infiltrate on site. The manner that the runoff is proposed to discharge will not cause a significant adverse impact to downstream receiving waters, critical areas or downgradient properties.

Water – The project will be served from the water system that is within the LH520 water pressure zone. The lot will be served by domestic water service tapped off the 8-inch Ductile Iron (DI) water main in SE 37th St.

Sewer – The lot will be served by an existing 6-inch side sewer stubbed onto the lot from an existing 8-inch Concrete sewer main located in SE 37th St.

**Refer to Section X for Condition of Approval regarding Utilities.**

## **VI. STATE ENVIRONMENTAL POLICY ACT (SEPA)**

The proposal is exempt from SEPA review, per WAC 197-11-800 and BCC 22.02.032. Construction of a single-family residence is a categorical exemption.

## **VII. CHANGES TO THE PROPOSAL DUE TO STAFF REVIEW**

- The house was shifted further to the south to reduce the amount of disturbance in the required 50-foot top of slope buffer in an effort to further avoid impacts to the critical area steep slope and critical root zones and canopies of existing trees.
- The proposed restoration/enhancement plantings were increased to meet minimum spacing and density requirements per the City's Critical Areas Handbook.

## **VIII. CRITICAL AREAS LAND USE PERMIT DECISION CRITERIA**

### **A. Critical Areas Report Decision Criteria – Proposals to Reduce Regulated Critical Area Buffer – LUC 20.25H.255.B.**

The Director may approve, or approve with modifications, a proposal to reduce the regulated critical area buffer on a site where the applicant demonstrates:

- **The proposal includes plans for restoration of degraded critical area or critical area buffer functions which demonstrate a net gain in overall critical area or critical area functions;**

Finding: The proposal includes a mitigation plan that includes native planting within the small area of on-site steep slope and the top of slope buffer. The critical areas report identifies and documents the degraded conditions on-site, which this proposal seeks to mitigate and enhance to further protect the functions of the steep slope and buffer area

for slope stability, stormwater quality and wildlife habitat. With the installation of native vegetation, a net gain in buffer functions and values is expected. **Refer to Section X for Condition of Approval regarding Mitigation Plan.**

- **The proposal includes plans for restoration of degraded critical area or critical area buffer functions which demonstrate a net gain in the most important critical area or critical area buffer functions to the ecosystem in which they exist;**

Finding: A majority of the critical area and buffer are degraded, due to the presence of existing lawn, landscaping and impervious surface. Functions provided by this area are therefore limited. The proposed enhancement area (1,391 sq. ft.) will provide greater sediment/pollutant filtration, increased stormwater absorption, potential wildlife habitat, and further enhance slope stability. The restoration plantings will also provide greater erosion protection to the adjacent steep slope area.

- **The proposal includes a net gain in stormwater quality function by the critical area buffer or by elements of the development proposal outside of the reduced regulated critical area buffer;**

Finding: The proposed enhancement area is located between the single-family dwelling and steep slope area. The new native mitigation plantings will significantly increase stormwater quality functions of the buffer area over the currently degraded condition (lawn).

- **Adequate resources to ensure completion of any required restoration, mitigation and monitoring efforts;**

Finding: A five-year maintenance and monitoring plan has been included in the proposal. In addition to maintenance and monitoring activities, an assurance device associated with the maintenance and monitoring will be required as part of the Building Permit. **Refer to Section X for Conditions of Approval regarding Maintenance and Monitoring and Maintenance and Monitoring Assurance Device.**

- **The modifications and performance standards included in the proposal area not detrimental to the functions and values of critical area and critical area buffer off-site; and**

Finding: The modifications and performance standards included in the proposal are not detrimental to off-site critical areas and buffers, and are expected to lead to improved buffer function for on-site and off-site steep slope critical areas and buffers. As noted in the Critical Areas Report, the existing low level of functions provided by this site would continue without the requested buffer reduction and buffer enhancement plan. Therefore, slope buffer functions will be enhanced with the proposed actions to mitigate for the disturbance.

- **The resulting development is compatible with other uses and development in the same land use district.**

Finding: The proposal does not change the underlying zoning or existing land use. The existing single-family residence will be demolished and replaced with a new dwelling with this proposal.

**B. The Director may approve, or approve with modifications an application for a Critical Areas Land Use Permit if (LUC 20.30P.140):**

- **The proposal obtains all other permits required by the Land Use Code; and**

Finding: The applicant will be required to obtain a building permit after approval of the Critical Areas Land use Permit in order to execute the project. **Refer to Section X for Condition of Approval regarding Building Permit.**

- **The proposal utilizes to the maximum extent possible the best available construction, design and development techniques which result in the least impact on the critical area and critical area buffer; and**

Finding: The proposed project has been designed and located to minimize impacts to and improve critical area and buffer functions. The proposed single-family home is located within an area of existing development and within a top of slope buffer area of low buffer function due to degraded conditions. Locating the new dwelling, as proposed, has the least impact on the small area of steep slope and critical area buffer. The design includes the removal of existing non-native and invasive vegetation within the small area of on-site steep slope and top of slope buffer, and includes mitigation planting of native species commonly found within steep slope and steep slope buffers, as prescribed in the City's Critical Areas Handbook.

The review of this permit is reliant upon the findings of qualified professionals submitted by the applicant as part of this proposal. The property owner will be required to execute a Hold Harmless Agreement, releasing the City from liability for any improvements within the critical area or critical area buffer. **Refer to Section X for Conditions of Approval regarding Hold Harmless Agreement.**

- **The proposal incorporates the performance standards of Part 20.25H LUC to the maximum extent applicable; and**

Finding: Performance standards related to steep slopes are being met by this proposal as described in Section III.B above.

- **The proposal will be served by adequate public facilities including streets, fire protection, and utilities; and**

Finding: The project will be served by adequate public facilities which currently exist on and adjacent to the subject site.

- **The proposal includes a mitigation or restoration plan consistent with the requirements of LUC 20.25H.210; and**

Finding: The applicant has prepared a preliminary restoration and enhancement planting plan to mitigate for the impacts to the small area of critical area steep slope and encroachment into the 50' top of slope buffer, consistent with LUC 20.25H.210. The plan also contains a five-year maintenance and monitoring plan to ensure successful establishment of installed planting. Following installation of the mitigation planting, the applicant will be required to contact staff to inspect the planting to ensure it meets the approved mitigation plan. **Refer to Section X for Conditions of Approval regarding Maintenance and Monitoring and Land Use Inspection.**

- **The proposal complies with other applicable requirements of this code.**

Finding: As discussed within this report, the proposal will comply with all applicable requirements of the Land Use Code.

## **IX. CONCLUSION AND DECISION**

After conducting the various administrative reviews associated with this proposal, including Land Use Code, Bellevue City Code and Standard compliance reviews, the Director of the Development Services Department does hereby **approve with conditions** the proposal to modify the critical area steep slope 50-foot top of slope buffer, to allow for the encroachment of a new single-family dwelling.

**Note- Expiration of Approval:** In accordance with LUC 20.30P.150 a Critical Areas Land Use Permit automatically expires and is void if the applicant fails to file for a Clearing and Grading Permit or other necessary development permits within one year of the effective date of the approval.

## **X. CONDITIONS OF APPROVAL**

**The applicant shall comply with all applicable Bellevue City Codes and Ordinances including but not limited to:**

<b><u>Applicable Ordinances</u></b>	<b><u>Contact Person</u></b>
Clearing and Grading Code- BCC 23.76	Janney Gwo, 425-452-6190
Land Use Code- BCC 20.25H	Laurie Tyler, 425-452-2728
Noise Control- BCC 9.18	Laurie Tyler, 425-452-2728

**The following conditions are imposed under the Bellevue City Code or SEPA authority referenced:**

**1. Building Permit Required:** Approval of this Critical Areas Land Use Permit does not constitute an approval of a development permit. Plans submitted as part of the permit application shall be consistent with the plans reviewed for this approval.

Authority: Land Use Code 20.30P.140  
Reviewer: Laurie Tyler, Land Use

**2. Geotechnical Review:** The project geotechnical engineer must review the final construction plans, including all foundation, slab-on-grade floor, and infiltration designs. A letter from the geotechnical engineer stating that the plans conform to the recommendations in the geotechnical report and any addendums and supplements must be submitted to the clearing and grading section prior to issuance of the construction permit.

Authority: Clearing & Grading Code 23.76.050  
Reviewer: Janney Gwo, Clearing and Grading

**3. Geotechnical Inspection:** The project geotechnical engineer must provide geotechnical inspection during project construction, including monitoring and testing of soil cuts and fill, subgrades for foundations and footing, utility trench backfill, and any unusual seepage, slope or subgrade conditions.

Authority: Clearing & Grading Code 23.76.050  
Reviewer: Janney Gwo, Clearing and Grading

**4. Utilities:** Utility review has been completed on the preliminary information submitted at the time of this application. The review has no implied approvals for water, sewer and storm drainage components of the project. A New Single Family (BS) permit will be required for review and approval of the utility design for storm drainage. The individual side sewer connections will be reviewed and permitted under a separate Side Sewer Connection (UA) side sewer permit. If a water meter upgrade is needed an individual water connection will be reviewed and permitted under a separate Water Service (UC) permit. Final civil engineering may require changes to the site layout to accommodate the utilities. Preliminary storm drainage review was completed under the codes and standards in place at the time of this application.

Authority: Bellevue City Code 24.02, 24.04, 24.06  
Reviewer: Alison Kolberg, Utilities Department

**5. Arborist Report Recommendations:** All recommendations from the arborist report, prepared by Neal Baker, arboristsNW, LLC, dated May 9, 2019, shall be incorporated into the project and followed as recommended. In particular, trees T1, T2, T3, T4, T6 and T8 as identified on survey dated May 10, 2019.

Authority: Land Use Code 20.30P.140.E; 20.25H.225  
Reviewer: Laurie Tyler, Land Use

**6. Mitigation Plan:** A final mitigation plan in accordance with the conceptual mitigation plan provided under this application (Attachment 2) shall be submitted for review and approval by the City of Bellevue prior to issuance of the Building Permit. The plan shall document the total area of new critical area buffer planting and the plans shall be consistent with the guidance provided in the City's Critical Areas Handbook.

Authority: Land Use Code 20.25H.105.C.3  
Reviewer: Laurie Tyler, Land Use

**7. Maintenance & Monitoring:** A maintenance & monitoring plan in conformance with the plan submitted under this application shall be submitted for review and approval by the City of Bellevue prior to issuance of the Building Permit. The mitigation plan shall be maintained and monitored for a minimum of **five (5) years**. Annual reporting shall be submitted at the end of each growing season or by December 1 for each of the five years this plan is applicable. All reporting shall be submitted by email to **lt Tyler@bellevuewa.gov**. or by mail to:

Environmental Planning Manager  
Land Use Division  
Development Services Department  
City of Bellevue  
PO Box 90012  
Bellevue, WA 98009-9012

Authority: Land Use Code 20.25H.220.D, 20.25H.220.H  
Reviewer: Laurie Tyler, Land Use

**8. Land Use Inspection:** Following installation of the restoration planting, the applicant shall contact Land Use Staff to inspect the restoration enhancement area. Staff shall verify the quantity and quality of the proposed plants to be installed, and that the restoration area is in a healthy and growing condition.

Authority: Land Use Code 20.30P.140  
Reviewer: Laurie Tyler, Land Use

**9. Maintenance and Monitoring Assurance Device:** After the Land Use Inspection and acceptance of the restoration planting, a financial surety is required to be submitted to ensure the mitigation planting successfully establishes. A maintenance assurance device that is equal to 20% of the cost of plants, installation, and the cost of monitoring is required to be held for a period of five (5) years from the date of building permit issuance. A cost estimate is required to be provided with the building permit. The financial surety is required to be posted prior to signoff of land use inspection. Release of the surety after the 5-year monitoring period is contingent

upon a final inspection of the planting by Land Use Staff that finds the maintenance and monitoring plan was successful and the mitigation meets performance standards.

Authority: Land Use Code 20.25H.220.F  
Reviewer: Laurie Tyler, Land Use

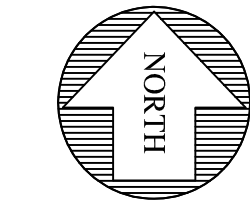
**10. Pesticides, Insecticides, and Fertilizers:** The applicant must submit as part of the required construction permit, information regarding the use of pesticides, insecticides, and fertilizers in accordance with the City of Bellevue's "Environmental Best Management Practices".

Authority: Land Use Code 20.25H.220.H  
Reviewer: Laurie Tyler, Land Use

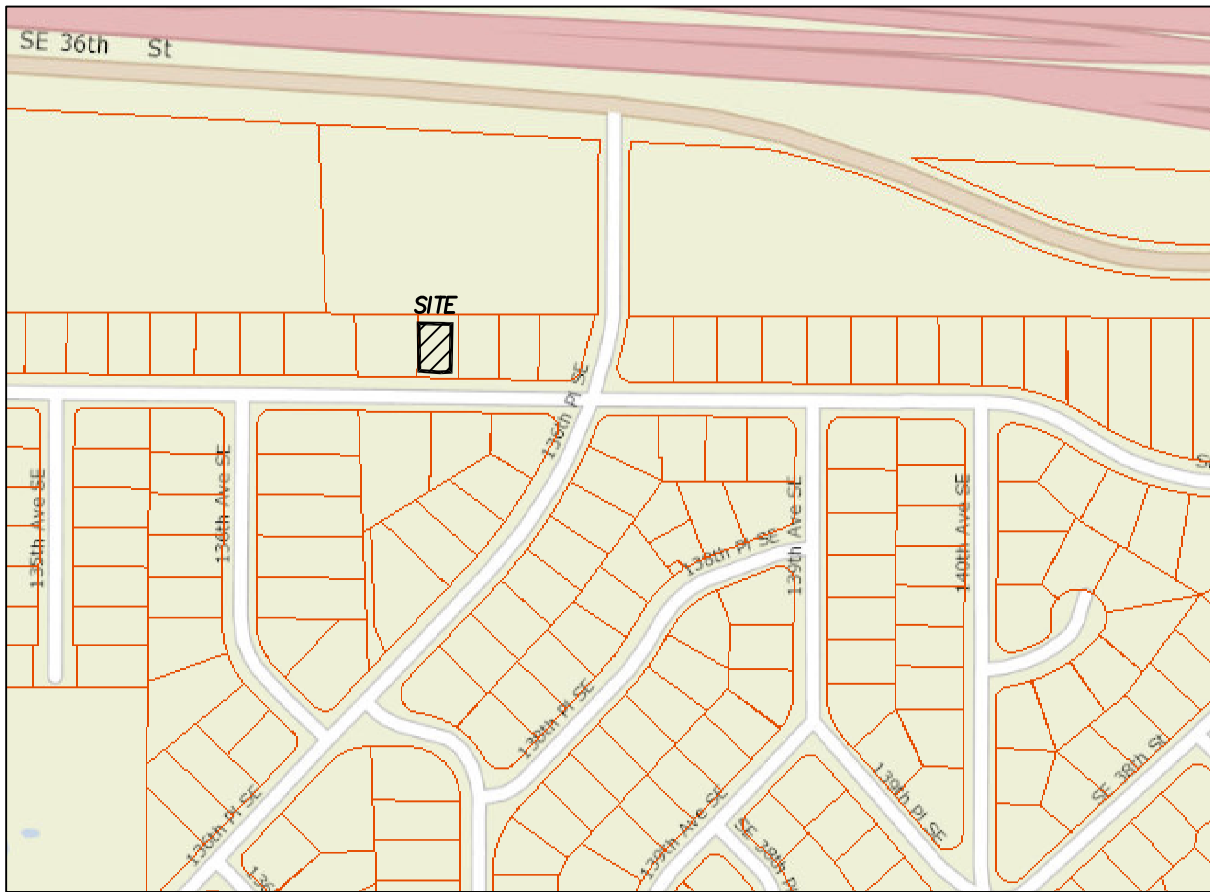
**11. Hold Harmless Agreement:** Prior to building permit approval, the applicant or property owner shall submit a hold harmless agreement releasing the City of Bellevue from any and all liability associated with the steep slope buffer modification. The agreement must meet city requirements and must be reviewed by the City Attorney's Office for formal approval.

Authority: Land Use Code 20.30P.170  
Reviewer: Laurie Tyler, Land Use

LU RESIDENCE  
SE 1/4 OF SW 1/4 OF SECTION 10, T. 24 N., R. 05 E., W.M.  
CITY OF BELLEVUE, STATE OF WASHINGTON



SCALE 1" = 10'



VICINITY MAP  
N.T.S.

PROJECT TEAM:

OWNER: DAVID LU  
13414 SE 85TH ST  
RENTON, WA 98056  
(509) 901-8199

ARCHITECT: PAUL MONSEF  
MONSEF DONOGH DESIGN GROUP  
2806 NE SUNSET BLVD. SUITE F  
RENTON, WA 98056  
(206) 612-8647

ENGINEER: NICOLE MECUM, PE  
ENCOMPASS ENGINEERING &  
SURVEYING  
165 N.E. JUNIPER STREET, SUITE  
201  
ISSAQUAH, WA 98027  
(425) 392-0250

SURVEY: MARK BORYS, PLS  
10801 MAIN STREET, SUITE 102  
BELLEVUE, WA 98004  
(425) 458-4488

GEOTEH: ZACH LOGAN  
MIGZI GROUP, INC.  
PO BOX 44840  
TACOMA, WA 98448  
(253) 537-9400

ENVIRONMENTAL: JEFF MALLAHAN  
WETLAND RESOURCES  
9505 19TH AVE SE, SUITE 106  
EVERETT, WA 98208  
(425) 337-3174

SITE INFORMATION:

TAX PARCEL: 220650-0030  
SITE ADDRESS: 13632 SE 37TH ST  
BELLEVUE, WA 98008  
SITE AREA: 8,350 SQ. FT. = 0.19 ACRES  
IMPERVIOUS AREA: 3,914 SQ. FT.

LEGAL DESCRIPTION:

LOT 6, BLOCK 1, EASTGATE ADDITION  
DIVISION "K" ACCORDING TO THE PLAT  
RECORDED IN VOLUME 55 OF PLATS, PAGES  
21-22, IN KING COUNTY, WASHINGTON.

BASIS OF BEARING:

ACCEPTED THE BEARING OF SE 37TH ST, BASED ON FOUND  
MONUMENTS IN CASE, PER PLAT.

VERTICAL DATUM:

NAVD88 PER CITY OF BELLEVUE VERTICAL STA. 404

BENCH MARK:

3" x 3" CONCRETE MON W/ LEAD & TACK IN CASE; TOP MON  
TO TOP RIM CASE 0.55 FEET AT INTERSECTION SE 37TH ST &  
136TH PL SE.

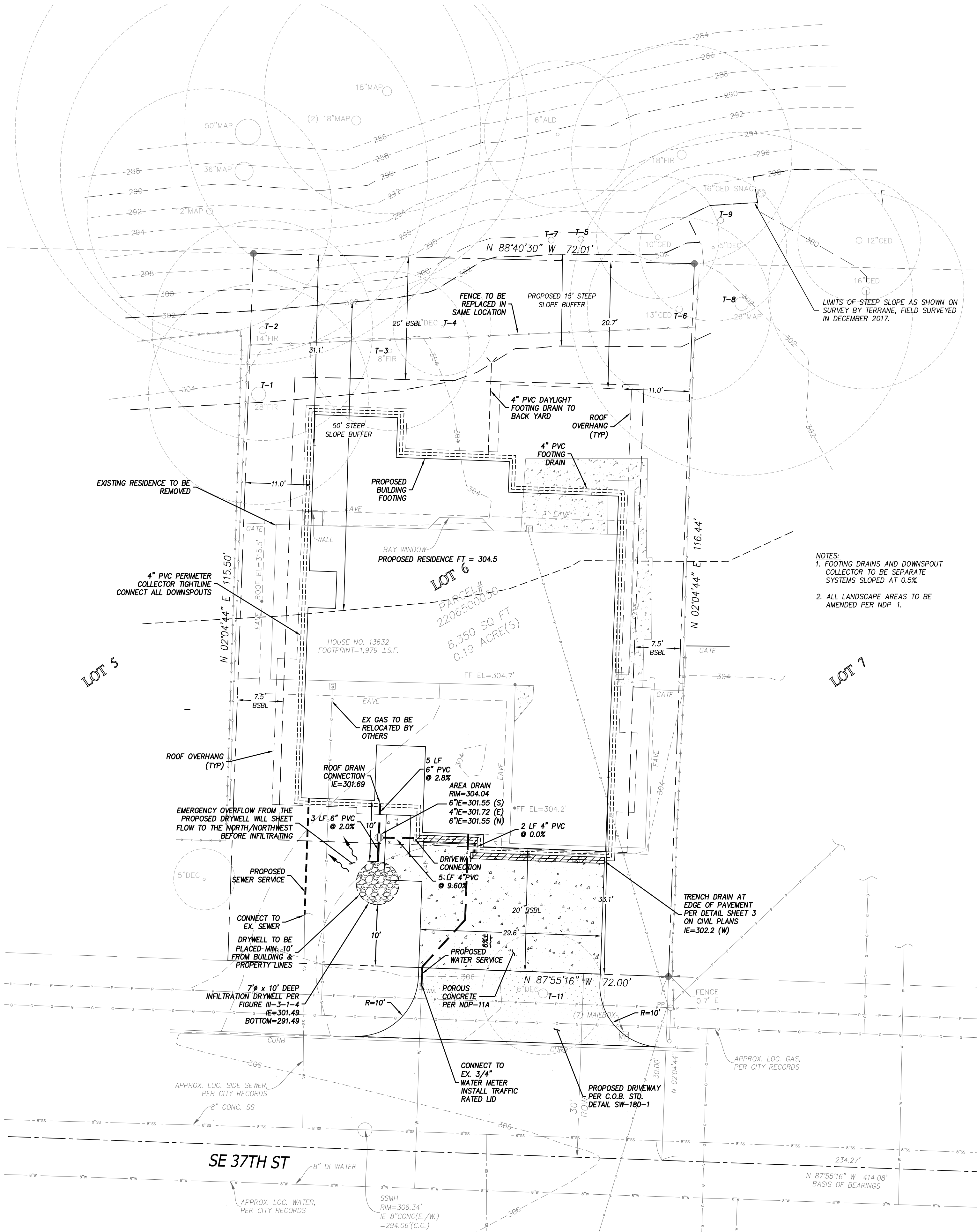
ELEV: 302.62'

SETBACKS:

FRONT - 20 FT  
REAR - 20 FT  
SIDE YARD - 5 FT MIN, 15 FT TOTAL

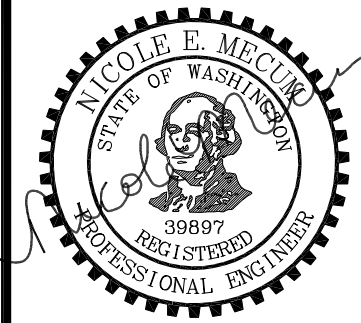
TREE RETENTION TABLE

TREE #	SPECIES	DIAMETER INCHES	RETAIN? Y/N
1	DOUGLAS FIR	28	Y
2	DOUGLAS FIR	14	Y
3	DOUGLAS FIR	8	Y
4	APPLE	5	Y
5	OFFSITE (NOT CALCULATED)	-	-
6	WESTERN RED CEDAR	13	Y
7	OFFSITE (NOT CALCULATED)	-	-
8	OFFSITE (NOT CALCULATED)	-	-
9	OFFSITE (NOT CALCULATED)	-	-
10	CHERRY	6	N
TOTAL DIAMETER INCHES		81	
DIAMETER INCHES RETAINED		81	
PERCENTAGE RETAINED		100%	



REVISIONS

DESCRIPTION	BY	DATE
PER CITY COMMENTS	CJM	05/10/19
THE PLANS SET FORTH AN ENGINEERING DESIGN AND SHALL REMAIN THE PROPERTY OF ENCOMPASS ENGINEERING & SURVEYING.		



05/10/19

LU RESIDENCE

SITE PLAN B



Western Washington Division  
165 NE Juniper Street, Suite 201 • Issaquah, WA 98027 • Phone: (425) 392-0250 • Fax: (425) 391-3055  
Eastern Washington Division  
407 Stillwater Blvd. • Cle Elum, WA 98922 • Phone: (509) 674-7433 • Fax: (509) 674-7419

JOB NO.	18510
DATE	05/10/19
SCALE	1"=10'
DESIGNED	NEM
DRAWN	TLK
CHECKED	NEM
APPROVED	NEM



**CRITICAL AREA REPORT  
AND  
BUFFER MITIGATION PLAN**

**FOR**

**13632 SE 37<sup>TH</sup> ST**  
***BELLEVUE, WA***

*Wetland Resources, Inc. Project #18270*

Prepared By  
Wetland Resources, Inc.  
9505 19th Avenue SE, Suite 106  
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May 2, 2019

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APPENDIX C: U.S. ARMY CORPS OF ENGINEERS DATA FORMS

## 1.0 INTRODUCTION

Wetland Resources, Inc. (WRI) performed a site investigation on August 21, 2018 to determine the presence of any critical areas on or in the vicinity of King County Tax Parcel # 2206500030 at 13632 SE 37<sup>th</sup> Street in the City of Bellevue, Washington. The investigation area is located slightly south of I-90, and approximately 0.75 mile east of I-405. Site access is from the front driveway on SE 37<sup>th</sup> Street. The Public Land Survey System (PLSS) locator for the property is Section 10, Township 24N, Range 05E, W.M. This property is located within the Cedar/Sammamish Watershed, Water Resources Inventory Area (WRIA) 8.

The purpose of this report is to provide information on existing conditions of the site as required when a project is requesting a modification of critical areas, buffers, or setbacks. This report documents presence of critical areas on and in the vicinity of the subject site. Please note: Much of the information presented in this report is based on the analysis provided by the project's geotechnical engineer. For information regarding the steep slopes present on the subject site, refer to the *Geotechnical Engineering Report*, prepared by *Migizi Group, Inc.* (MGI), included in Appendix A of this document.



**Figure 1** Aerial Photo of the Subject Property.

## 1.1 SITE DESCRIPTION

The 0.19-acre subject property is located within a dense single-family neighborhood, itself being developed as a single-family residence with lawn and minimum landscaping. To the north of the parcel, between the site and I-90, are office buildings with associated parking lots. The local topography slopes steeply down near the northern property boundary to the parking area, although almost all of the on-site topography is flat.

## 1.2 REVIEW OF EXISTING INFORMATION

Prior to conducting the site reconnaissance, public resource information was reviewed to gather background information on the subject property and the surrounding area in regards to wetlands, streams, and other critical areas. These sources include the following:

- USFWS National Wetlands Inventory (NWI)
- USDA/NRCS Web Soil Survey (WSS)
- King County iMap Online Application (iMap)
- WDNR Forest Practices Application Mapping Tool (FPAMT)
- WDFW Priority Habitat and Species (PHS) Interactive Map
- WDFW SalmonScape online map
- StreamNet Mapper

### *Streams and Lakes*

Sunset creek, which is a fish-bearing tributary to Richard's Creek, is depicted flowing from south to north approximately 0.2 mile west of the subject site. StreamNet indicates the presence of Chinook (*Oncorhynchus tshawytscha*) in the stream. PHS and SalmonScape indicate Coho salmon (*O. kisutch*) presence within the stream. Although iMap classifies sunset creek as unclassified, FPAMT confirms that this is a fish stream. This critical area is well away from the subject property, and no other streams or lakes are nearby.

### *Wetlands*

NWI identifies Sunset Creek as a riparian wetland. No wetlands are shown near the site on PHS, NWI, or any other of the referenced publicly available resources.

### *Floodplains*

No areas of special flood hazard are depicted near the subject site by any of the referenced publicly available resources.

### *Species of Concern*

None of the referenced publicly available resources indicate the presence of any species of local concern (or their associated habitats) on or adjacent to the site.

### *Soils and Geologic Conditions*

Elevation Contours available on iMap indicate that a steep slope geologic hazard critical area is likely present in the sloped area between the site and the business parking area to the north. The

northern portion of the site is mapped as Arents, Everett material, while the southern portion is mapped as Indianola Loamy Sand, 5 to 15 percent slopes (via WSS).

## 2.0 CRITICAL AREAS DETERMINATION

WRI staff conducted a site visit on August 21, 2018 to locate any environmentally critical areas occurring within or near the subject site.

Ordinary High Water Mark (OHWM) boundaries of streams, lakes, and marine waters if present, are determined through use of methodology presented in The Washington State Department of Ecology document *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Anderson et al 2016). Designation of streams and lakes is consistent with the water typing system established in the Washington Administrative Code (WAC) 222-16-030.

Wetland boundaries if present, are determined using the routine approach described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (U.S. Army Corps of Engineers 2010). Under the routine methodology, the process for making a wetland determination is based on three steps:

- 1.) Examination of the site for hydrophytic vegetation (species present and percent cover);
- 2.) Examination of the site for hydric soils;
- 3.) Determining the presence of wetland hydrology

The presence of any wildlife habitat consistent with that used by species of local importance, was determined through assessment of the environment and any present species by experienced wildlife biologists using on-site observations, as well as consideration of the surrounding landscape.

The presence or absence of steep slope hazard areas was determined in conjunction with MGI, whom provided a geotechnical report for the property, and subsequent review letter dated March 8, 2018, and January 25, 2019, respectively.

## 2.1 RESULTS OF INVESTIGATION

Based on the results of our site investigation, review of existing information, and the results of the geotechnical analysis, a steep slope hazard area was identified along the northern property boundary, between the subject property and the business parking area to the north. The following excerpt from MGI further describes the site, *topographically, the project area is relatively level, with minimal grade change being observed over its extent. The transition between the project area, adjacent residential sites, and the commercial complex to the north, however, is marked by a 15-foot high slope, which contains localized gradients of  $\pm 50$  percent. This region is considered a Steep Slope Geologic Hazard Area by City of Bellevue land*

use codes, as described by LUC 20.25H.120. No other critical area conditions were found on or in the vicinity of the site.

### **2.1.1 On-site Characteristics (Non-wetland)**

No wetland conditions were observed on the subject site. On-site dominant vegetation is primarily maintained lawn with very infrequently scattered landscaping cultivars. Given the lack of conclusive vegetative information, soils and hydrologic condition were used to make wetland determinations on the subject site.

Typical soils on the subject site have a Munsell color of very dark grayish brown (10YR 3/2) in the top 2 inches. Soils become a slightly brighter dark brown (10YR 3/3) from 2 to 9 inches beneath the surface, and even brighter dark yellowish brown (10YR 3/4) down to at least 16 inches of depth. These soil conditions do not meet any wetland indicators.

Hydrology was absent from the sampled soils and lacked any other hydrologic indicators. Given lack of any vegetative, soil, or hydrological indicators, the conditions of the subject site do not meet the definition of a wetland.

Additionally, no streams, water courses, channels, or associated floodplains are present on or adjacent to the site.

### **2.1.2 Steep Slope Hazard Area**

Within the geotechnical report provided by MGI, it is confirmed that the area in question north of the subject site is a steep slope geologic hazard area as described in LUC 20.25H.120. Steep slope areas are defined as areas with slope greater than 40 percent, at least 1,000 square feet, and with a rise of at least 10 feet (LUC 20.25H.120(A)(2)). Pursuant to LUC 20.25H.120(B)&(C), steep slope areas receive protective buffers of 50 feet from top-of-slope, and structure setbacks of 75 feet from toe-of-slope.

These steep slopes were verified, surveyed, and assessed by MGI. Please refer to the attached *Geotechnical Engineering Report* (dated 3/8/18) in Appendix A. The report finds that “the region is currently in a stable configuration, and minimal buffers and/or setbacks need be implemented to address this hazard.” Further discussion provided in a *Plan Review Letter* by MGI dated January 25, 2019, outlines the recommended Steep Slope Buffer, *the new residence will be setback a minimum distance of 15-feet from the crest of the aforementioned steeply-sloped area.*

### **2.1.3 Wildlife Habitat Assessment**

LUC 20.25H.150 stipulates that areas with naturally occurring ponds, habitat associated with a species of local importance, or the presence of such a species shall be designated as critical areas.

The subject site is developed as a single-family residence with a lawn and minimal landscaping. A privacy fence on three sides of the property separates it from the surrounding area, which is a highly developed landscape. Given these site conditions, little to no usable wildlife habitat is located on-site. The slope abutting the backyard property boundary is part of a partially forested strip of land running along the back fence of the neighboring homes but is less than 50 feet wide due to large parking and office facilities on the downslope side. Additionally, this strip of sloped

land is bisected part way across by another section of fencing. The poor vegetative coverage, thin width, and bisected nature of this area disallows it from being a functional wildlife corridor. A number of significant trees are located within this area and have intact native canopy. However, due to the urban setting this canopy does not provide a significant contiguous vegetative corridor. Additionally, no habitat features are present that have a primary association with any federal, state, or locally protected species, and there are no naturally occurring ponds nearby.

The City of Bellevue requires additional protections for habitat that has a primary association with species of local importance, and/or state or federally protected species. Considering the habitat conditions on and adjacent to the subject site, no critical areas associated with species of local importance are present. Therefore, no impacts will occur to such critical areas.

### **3.0 PROPOSED PROJECT**

The applicant is proposing the demolition of the existing structure and the construction of a new primary residence on the subject site. The project area is located partially within the top-of-slope buffer of the adjacent steep slope area to the north.

Over fifty percent of the subject property is completely encumbered by the 50-foot top of slope buffer. A strict adherence to the provisions of the Bellevue Land Use Code would preclude any re-development on this parcel. Thus, the applicant is requesting a modification to the on-site steep slope buffer. No impacts to the steep slope areas are proposed.

The proposed new construction has been designed according to the recommendations by the geotechnical engineer, as found in the *Geotechnical Engineering Report* (Appendix A). By implementing the design recommendations and construction techniques of the geotechnical engineer, the proposed project will preserve the integrity of the on-site steep slope.

### **3.1 PROPOSED MITIGATION**

Mitigation for the modification of the steep slope buffer will be provided through native vegetation enhancement between the proposed project and steep slope area to the north. A Buffer Mitigation Plan is provided in section 5.0 of this report.

## **4.0 PROPOSED MODIFICATION TO LAND USE CODE PROVISIONS**

Greater than fifty percent of the developed portion of the site is encumbered by steep slope buffers. Strict adherence to the provisions of the Bellevue Land Use Code would preclude any re-development on this parcel. Any new development on this parcel requires a modification of critical area buffers.

The purpose of this critical area report is to modify the steep slope buffer identified in LUC 20.25H.120. Specifically, the applicant is proposing to infringe upon the steep slope buffer in the following manner:

- Reduce top-of-slope buffer to 15 feet for the proposed construction of a new primary structure, pursuant to geotechnical recommendations provided by MGI.

#### **4.1 ADDITIONAL PROVISIONS REQUIRED FOR LANDSLIDE HAZARDS AND STEEP SLOPES**

##### **4.1.1 LUC 20.25H.125 Performance Standards – Landslide Hazards and Steep Slopes**

Text in *italics* below is from LUC 20.45H.125, with WRI responses in plain text.

*In addition to generally applicable performance standards set forth in LUC 20.25H.055 and 20.25H.065, development within a landslide hazard or steep slope critical area or the critical area buffers of such hazards shall incorporate the following additional performance standards in design of the development, as applicable. The requirement for long-term slope stability shall exclude designs that require regular and periodic maintenance to maintain their level of function.*

*A. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;*

The proposed redevelopment of the site (house demo, and construction of a new primary residence) is located outside of steep slope areas. For grading and foundation specifications, please see project plans and the attached *Geotechnical Engineering Report* in Appendix A.

*B. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation;*

The proposed construction will utilize previously developed areas to the greatest extent possible, and have no impacts on steep slopes.

The proposed project will impact buffer area that has been previously disturbed and graded to accommodate the existing residence and maintained lawn/landscaping. No natural landforms or vegetation will be impacted.

*C. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;*

This development does not increase risk or buffers on neighboring properties.

*D. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall;*

Retaining walls are not required or proposed for this project.

*E. Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer;*

No new impervious surface is proposed within the on-site steep slope areas. Within the steep slope buffer, new impervious surface is minimized by utilizing the existing footprint of the original structure. 779 square feet of the newly proposed structure (57%) is sited over existing impervious surface.

*F. Where change in grade outside the building footprint is necessary, the site retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with this criteria;*

Grading is not proposed outside the building footprint. No grading is proposed within the on-site steep slope areas.

*G. Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation;*

Retaining walls, rockeries, and other retaining structures are not required or proposed for this project. Please refer to the attached *Geotechnical Engineering Report* in Appendix A for a discussion of the foundation walls.

*H. On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification;*

No construction is proposed within the on-site steep slope areas.

*I. On slopes in excess of 40 percent, piled deck support structures are required where technically feasible for parking or garages over fill-based construction types; and*

No construction is proposed within the on-site steep slope areas.

*J. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210.*

Any temporary disturbances will be restored to pre-existing or better conditions. A Buffer Mitigation Plan is proposed as mitigation for the SFR construction and top-of-slope buffer reduction. Please refer to section 5.0 of this report for details of the proposed mitigation plan.

#### **4.1.2 LUC 20.25H.135 Mitigation and Monitoring – Additional Provisions**

In addition to the mitigation requirements of LUC 20.25H.210, an erosion and sediment control plan, drainage plan, and monitoring of surface waters (if applicable) is required.

An erosion and sediment control plan and drainage plan are included in the attached *Geotechnical Engineering Report* in Appendix A (pages 7 & 8). If applicable and recommended by the Director or project engineers, surface water will be monitored during construction in accordance with this code section.

#### **4.1.3 LUC 20.25H.140 Critical Areas Report – Additional Provisions**

In addition to the general requirements of LUC 20.25H.230, the critical areas report must also address and include the following:

- *Site and Construction Plans (including survey)*: Appendix B of this report includes a site plan and surveyed site information. Additional constructions plans and details are included with the Critical Areas submittal.
- *Assessment of Geological Characteristics*: A geological assessment of the site is included in the attached *Geotechnical Engineering Report* in Appendix A.
- *Analysis of Proposal*: A hazards analysis is included within the *Geotechnical Engineering Report* attached as Appendix A.
- *Minimum Critical Area Buffer and Building Setback*: The *Geotechnical Engineering Report* and supplemental *Plan Review Letter* (see Appendix A) includes a minimum steep slope buffer recommendation.

#### **4.1.4 LUC 20.25H.145 Critical Areas Report – Approval of Modifications**

Text in italics below is from LUC 20.25H.145, with WRI responses in plain text.

*Modifications to geologic hazard critical areas and critical area buffers shall only be approved if the Director determines that the modification:*

*A. Will not increase the threat of the geological hazard to adjacent properties over conditions that would exist if the provisions of this part were not modified;*

This project does not increase geological hazard risk on neighboring properties. Please refer to the attached *Geotechnical Engineering Report* in Appendix A for an analysis.

*B. Will not adversely impact other critical areas;*

No other critical areas are located on or in the vicinity of the site. Only the previously mentioned steep slope areas exist.

*C. Is designed so that the hazard to the project is eliminated or mitigated to a level equal to or less than would exist if the provisions of this part were not modified;*

The hazard to the project is mitigated to a level equal to or less than would exist if the standard prescriptive buffer and setback were observed. As described in the attached *Geotechnical Engineering Report*, no negative impacts to slope stability are expected.

*D. Is certified as safe as designed and under anticipated conditions by a qualified engineer or geologist, licensed in the state of Washington;*

As described in the attached *Geotechnical Engineering Report*, the project was analyzed and concluded safe as long as the specified geotechnical recommendations are followed.

*E. The applicant provides a geotechnical report prepared by a qualified professional demonstrating that modification of the critical area or critical area buffer will have no adverse impacts on stability of any adjacent slopes, and will not impact stability of any existing structures. Geotechnical reporting standards shall comply with requirements developed by the Director in City of Bellevue Submittal Requirements Sheet 25, Geotechnical Report and Stability Analysis Requirements, now or as hereafter amended;*

As described in the attached *Geotechnical Engineering Report*, no negative impacts to slope stability are expected. The geotechnical report complies with City of Bellevue- Sheet 25 standards.

*F. Any modification complies with recommendations of the geotechnical support with respect to best management practices, construction techniques or other recommendations; and*

The attached *Geotechnical Engineering Report* (Appendix A) includes construction recommendations and BMPs that will be followed during project construction. The construction specifications, BMPs, and TESC measures are also included in the project construction plans.

*G. The proposed modification to the critical area or critical area buffer with any associated mitigation does not significantly impact habitat associated with species of local importance, or such habitat that could reasonably be expected to exist during the anticipated life of the development proposal if the area were regulated under this part.*

WRI performed an assessment of the property to determine the likelihood of use by species of local importance, as defined in LUC 20.25H.150.A. As described in section 2.1.3, no species of local importance or habitats associated with these species were identified on site. The proposed project will not impact any habitat associated with species of local importance.

## **4.2 LUC 20.25H.255 CRITICAL AREA REPORT – DECISION CRITERIA**

Text in italics below is from LUC 20.25H.255, with WRI responses in plain text.

### *A. General*

*Except for the proposals described in subsection B of this section, the Director may approve, or approve with modifications, the proposed modification where the applicant demonstrates:*

- 1. The modifications and performance standards included in the proposal lead to levels of protection of critical area functions and values at least as protective as application of the regulations and standards of this code;*

As described in the attached *Geotechnical Engineering Report*, no negative impacts to slope stability are expected from the proposed project. Additionally, the applicant proposes to enhance the steep slope buffer with native vegetation between the proposed house and steep slope area. This mitigation area is located to further protect the steep slope area from residential uses. Mitigation measures will enhance buffer functions provided to the steep slope and will also benefit wildlife habitat. The steep slope and buffer area on-site will see a net gain in functions and values.

2. *Adequate resources to ensure completion of any required mitigation and monitoring efforts;*

If deemed necessary by the Director, the applicant will provide a surety at the time of the project approval.

3. *The modifications and performance standards included in the proposal are not detrimental to the functions and values of critical areas and critical area buffers off-site; and*

No other critical areas are located on or in the vicinity of the site. Only the previously mentioned steep slope areas exist.

4. *The resulting development is compatible with other uses and development in the same land use district.*

The proposed project is the redevelopment of a residential lot, and will be used for residential purposes. The subject site is in single-family residential use, and is surrounded by single-family residential use. This proposed project use is compatible with the land use district, and sized commensurate to surrounding residences.

*B. Decision Criteria – Proposals to Reduce Regulated Critical Area Buffer.*

*The Director may approve, or approve with modifications, a proposal to reduce the regulated critical area buffer on a site where the applicant demonstrates:*

1. *The proposal includes plans for restoration of degraded critical area or critical area buffer functions which demonstrate a net gain in overall critical area or critical area buffer functions;*

Any temporary disturbances will be restored to pre-existing or better conditions. Additionally, the applicant proposes to enhance the steep slope buffer with native vegetation between the proposed house and steep slope area. This mitigation area is located to further protect the steep slope area from residential uses, and to provided enhance slope stability. Mitigation measures will enhance buffer functions provided to the steep slope and will also benefit wildlife by creating potential habitat. The steep slope and buffer area will see a net gain in functions and values.

2. *The proposal includes plans for restoration of degraded critical area or critical area buffer functions which demonstrate a net gain in the most important critical area or critical area buffer functions to the ecosystem in which they exist;*

The area of buffer proposed for reduction is currently maintained lawn, landscaping, and impervious surface. Functions provided by this area in the existing condition are limited. The maintained residential yard provides negligible sediment/pollutant filtration, stormwater absorption, and potential wildlife habitat. The proposed enhancement area (1,391 square feet) will provide greater sediment/pollutant filtration, increased stormwater absorption, potential wildlife habitat, and further slope stability. The enhancement plantings will provide native food sources and areas for refuge on the site, significantly increasing the value of wildlife functions on-site. The planting area will also provide greater erosion protection to the adjacent steep slope area.

3. *The proposal includes a net gain in stormwater quality function by the critical area buffer or by elements of the development proposal outside of the reduced regulated critical area buffer;*

The proposed enhancement area is located between the SFR and steep slope area. The new plantings will significantly increase stormwater quality functions (sediment/pollutant filtration) of the buffer area over what currently exists on-site.

4. *Adequate resources to ensure completion of any required restoration, mitigation and monitoring efforts;*

If deemed necessary by the Director, the applicant will provide a surety at the time of the project approval.

5. *The modifications and performance standards included in the proposal are not detrimental to the functions and values of critical area and critical area buffers off-site; and*

No other critical areas are located on or in the vicinity of the site. Only the previously mentioned steep slope areas exist.

6. *The resulting development is compatible with other uses and development in the same land use district.*

The proposed project is the redevelopment of a residential lot, and will be used for residential purposes. The subject site is in single-family residential use, and is surrounded by single-family residential use. This proposed project use is compatible with the land use district, and sized commensurate to surrounding residences.

## **5.0 BUFFER MITIGATION PLAN**

The proposed SFR will impact 1,378 square feet of steep slope buffer area (including 779 sq ft of existing non-conforming development). In order to mitigate these impacts, the applicant proposes to enhance 1,391 square feet of buffer area between the proposed SFR and steep slope area to the north. This mitigation plan not only mitigates for the newly proposed buffer impacts (599 sq ft), but also provides mitigation for the portion of the project located within the previously developed areas (existing house).

**Table 1 - Steep Slope Buffer Impacts and Mitigation Summary**

<b>Impact Area (square feet)</b>	<b>Mitigation Type</b>	<b>Mitigation Area (square feet)</b>	<b>Mitigation Ratio</b>
1,378	Enhancement	1,391	>1:1

## 5.1 MITIGATION SEQUENCING

The City of Bellevue requires that all reasonable efforts be taken to avoid and minimize impacts to critical areas and buffers. If impacts do occur, they must be compensated in the following order of preference (LUC 20.25H.215):

- 1) *Avoiding the impact altogether by not taking a certain action or parts of an action;*
- 2) *Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;*
- 3) *Performing the following types of mitigation (listed in order of preference):*
  - a) *Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;*
  - b) *Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or*
  - c) *Compensating for the impact by replacing, enhancing, or providing substitute resources or environments;*
- 4) *Monitoring the hazard or other required mitigation and taking remedial action when necessary.*

The applicant is avoiding impacts to all on-site critical areas. However, complete avoidance of the steep slope buffer is not feasible due to the encumbrance of buffer over more than fifty percent of the property.

Impacts to the buffer are minimized to the extent possible by siting a majority of the proposed new construction over existing developed/disturbed areas. Impacts to undeveloped buffer area are limited to 599 square feet of maintained lawn. No trees are proposed to be removed as part of the development proposal. An alternatives analysis (see project narrative) shows that this proposed location is least impactful to steep slopes, and is most feasible. No impacts to functional vegetation will occur (tree or shrubs), and proper TESC procedures, and best management practices will be used during construction.

Buffer impacts will be mitigated through enhancement of the steep slope buffer between the proposed project and northern steep slope. The mitigation area is located to further protect the eastern steep slope area from residential uses. Mitigation measures will enhance buffer functions provided to the steep slope and will also benefit wildlife by creating habitat. The northern steep slope and buffer area will see a net gain in functions and values.

All mitigation areas will be monitored for a period of five years from the point of installation per the approved mitigation and monitoring plan. Contingency plans will be followed if deemed necessary by the City or consulting biologist. The monitoring period will end when the definition of success is met.

## 5.2 BUFFER ENHANCEMENT PLAN

The proposed enhancement area is located along the top of slope just north of the proposed project. The enhancement area currently consists of a sparsely vegetated landscaping and maintained lawn. Enhancement measures will result in improved slope stabilization and erosion

control functions, higher plant cover/diversity, and potential wildlife habitat. A net gain in steep slope buffer functions will be obtained through the proposed mitigation plan.

### 5.2.1 Planting Plan

Maintained lawn in the enhancement area will be replaced with a diverse palette of native trees, shrubs, and groundcover. After planting, the entire enhancement area shall be stabilized with woodchip mulch (see *Planting Notes* for more detail). The following plant list represents recommended native species for site enhancement and aesthetic value. Native plant substitutions may occur based on Landscape Engineer recommendations, pursuant to consulting biologist or City Director approval.

*Buffer Enhancement Area (1,391 square feet)*

<b>Common Name</b>	<b>Latin Name</b>	<b>Form</b>	<b>Min. Spacing</b>	<b>Quantity</b>
Big-leaf maple	<i>Acer macrophyllum</i>	1-gallon pot	9' O.C.	6
Red alder	<i>Alnus rubra</i>	1-gallon pot	9' O.C.	6
Western red cedar	<i>Thuja plicata</i>	1-gallon pot	9' O.C.	5
Vine maple	<i>Acer circinatum</i>	1-gallon pot	4.5' O.C.	10
Beaked hazelnut	<i>Corylus cornuta</i>	1-gallon pot	6' O.C.	9
Western serviceberry	<i>Amelanchier alnifolia</i>	1-gallon pot	4.5' O.C.	9
Osoberry	<i>Oemleria cerasiformis</i>	1-gallon pot	4.5' O.C.	9
Red elderberry	<i>Sambucus racemosa</i>	1-gallon pot	4' O.C.	9
Kinnikinnick	<i>Arcostaphylos uva-ursi</i>	4-inch pot	2' O.C.	95
Wild ginger	<i>Asarum caudatum</i>	4-inch pot	2' O.C.	95
Western sword fern	<i>Polystichum munitum</i>	4-inch pot	2' O.C.	95

### 5.2.2 Planting Notes

Plant between late fall and early spring and obtain all plants from a reputable nursery. Care and handling of all plant materials is extremely important to the overall success of the project. The origin of all plant materials specified in this plan shall be native plants, nursery grown in the Puget Sound region of Washington. Some species substitution may be allowed with agreement of the contracted ecologist.

#### *Timing*

Unless timing restrictions are established by the director for this project, all work shall be completed prior to final building inspection or issuance of a temporary certificate of occupancy or certificate of occupancy, as applicable for the development.

#### *Pre-Planting Meeting*

Prior to control of invasive species or installation of mitigation plantings, a site meeting between the contracted landscaper and the consulting ecologist may occur to resolve any questions that may arise. During this meeting a discussion regarding plant spacing and proper locations of plant species will occur, as well as an inspection of the plants prior to planting. Minor adjustments to the original design may be required prior to and during construction.

### *Handling*

Plants shall be handled so as to avoid all damage, including: breaking, bruising, root damage, sunburn, drying, freezing or other injury. Plants must be covered during transport. Plants shall not be bound with wire or rope in a manner that could damage branches. Protect plant roots with shade and wet soil in the time period between delivery and installation. Do not lift container stock by trunks, stems, or tops. Do not remove from containers until ready to plant. Water all plants as necessary to keep moisture levels appropriate to the species horticultural requirements. Plants shall not be allowed to dry out. All plants shall be watered thoroughly immediately upon installation. Soak all containerized plants thoroughly prior to installation.

### *Storage*

Plants stored by the Permittee for longer than one month prior to planting shall be planted in nursery rows and treated in a manner suitable to those species' horticultural requirements. Plants must be re-inspected by the landscape architect prior to installation.

### *Damaged plants*

Damaged, dried out, or otherwise mishandled plants will be rejected at installation inspection. All rejected plants shall be immediately removed from the site, and properly replaced.

### *Plant Names*

Plant names shall comply with those generally accepted in the native plant nursery trade. Any question regarding plant species or variety shall be referred to the landscape architect or consulting ecologist. All plant materials shall be true to species and variety and legibly tagged.

### *Quality and condition*

Plants shall be normal in pattern of growth, healthy, well-branched, vigorous, with well-developed root systems, and free of pests and diseases. Damaged, diseased, pest-infested, scraped, bruised, dried out, burned, broken, or defective plants will be rejected. Plants with pruning wounds over 1" in diameter will be rejected.

### *Roots*

All plants shall be balled and burlapped (B&B) or containerized, unless explicitly authorized by the landscape architect and/or consulting ecologist. Rootbound plants or B&B plants with damaged, cracked, or loose rootballs (major damage) will be rejected. Immediately before installation, plants with minor root damage must be root-pruned. Matted or circling roots of containerized plantings must be pruned or straightened and the sides of the root ball must be roughened from top to bottom to a depth of at least an inch.

### *Sizes*

Plant sizes shall be the size indicated in the plant schedule in approved plans, unless approved by the landscape architect or consulting ecologist. Larger stock may be acceptable provided that it has not been cut back to the size specified, and that the root ball is proportionate to the size of the plant. Smaller stock may be acceptable, and preferable under some circumstances, based on site-specific conditions. Measurements, caliper, branching, and balling and burlapping shall

conform to the American Standard of Nursery Stock by the American Association of Nurserymen (latest edition).

#### *Form*

Evergreen trees shall have single trunks and symmetrical, well-developed form. Deciduous trees shall be single trunked unless specified as multi-stem in the plant schedule. Shrubs shall have multiple stems and be well-branched.

#### *Timing of Planting*

Unless otherwise approved by the landscape designer/consulting ecologist, all planting shall occur between October 1 and March 1. Overall, the earlier the plants go into the ground during the dormant period, the more time they have to adapt to the site and extend their root systems before the water demands of summer.

#### *Weeding*

Non-native, invasive vegetation in the mitigation area will be hand-weeded from around all installed plants at the time of installation and on a routine basis throughout the monitoring period. No chemical control of vegetation on any portion of the site is recommended without prior approval from the City and consulting ecologist.

#### *Site conditions*

The landscaping contractor shall immediately notify the landscape designer and/or consulting ecologist of drainage or soil conditions likely to be detrimental to the growth or survival of plants. Planting operations shall not be conducted under the following conditions: freezing weather, when the ground is frozen, excessively wet weather, excessively windy weather, or in excessive heat.

#### *Planting Pits*

Planting pits shall be circular or square with vertical sides, and shall be at least 12" wider in diameter than the root ball of the plant. Break up the sides of the pit in compacted soils. Set plants upright in pits. All burlap shall be removed from the planting pit/rootball. Backfill of native soils shall be worked back into holes such that air pockets are removed without adversely compacting soils.

#### *Fertilizer*

Slow release fertilizer may be used if pre-approved by the landscape architect and consulting ecologist. Fertilizers shall be applied only at the base of plantings underneath the required covering of mulch (that does not make contact with stems of the plants). No fertilizers shall be placed within planting holes.

#### *Support Staking*

Most shrubs and many trees DO NOT require any staking. If the plant can stand alone without staking in a moderate wind, do not use a stake. If the plant needs support, then strapping or webbing should be used as low as possible on the trunk to loosely brace the tree with two stakes. Do not brace the tree tightly or too high on the trunk. If the tree is unable to sway, it will further

lose the ability to support itself. Do not use wire in a rubber hose for strapping as it exerts too much pressure on the bark. As soon as supporting the plant becomes unnecessary, remove the stakes. All stakes must be removed within two (2) years of installation.

#### *Arrangement and Spacing*

The plants shall be arranged in a pattern with the appropriate numbers, sizes, species, and distribution that are required in accordance with the approved plans. The actual placement of individual plants shall mimic natural, asymmetric vegetation patterns found on similar undisturbed sites in the area. Spacing of the plantings may be adjusted to maintain existing vegetation with the agreement of the landscape designer and/or consulting ecologist.

#### *Mulching*

Mulch (woodchip/arborist) shall be applied to the entire enhancement area after plant installation. Mulch shall be no less than 3 inches deep, and shall be kept 2 inches away from the trunks/stems of installed plants to prevent damage.

#### *Erosion and Sediment Control Plan*

An erosion control and sediment plan will be submitted with the building permit application. All applicable TESC measures shall be installed before project work commences.

### **5.3 MITIGATION GOALS AND OBJECTIVES**

The goal of this mitigation plan is to improve the functions of the steep slope buffer, and further protect the on-site steep slope from on-going residential uses. The specific goals of the plan are to increase vegetative species diversity and cover, increase browsing and cover opportunities for wildlife, increase soil stabilization capacity, limit erosion, improve the bio-filtration capacity of the buffer, and decrease invasive and non-native plant cover without harming steep slope areas.

To achieve the goals previously stated, non-native plants will be carefully removed from the steep slope buffer, and diverse native vegetation will be installed. Installed vegetation will be of high value to wildlife, thicket-forming, form wide-spreading and complex root structure, and will densely cover the ground surface.

Over time, this mitigation project is expected to achieve a net-gain in functions to wildlife, water quality, hydrology, erosion capacity, and soil stability within the buffer area, and is expected to better protect the on-site steep slope.

### **5.4 PROJECT MONITORING PROGRAM**

Monitoring shall be conducted annually for five years in accordance with the approved Buffer Mitigation Plan.

Requirements for monitoring project:

1. Initial compliance report/as-built map
2. Annual site inspection (once per year) for five years

3. Annual reports including final report (one report submitted in the fall of each monitored year)

#### *Purpose for Monitoring*

The purpose for monitoring shall be to evaluate the project's success. Success will be determined if monitoring shows at the end of five years that the definitions of success stated below are being met. Access shall be granted to the planting area for inspection and maintenance to the contracted landscaper and/or ecologist and the City during the monitoring period or until the project is evaluated as successful.

#### *Vegetation Monitoring*

Vegetation monitoring data shall be collected throughout the mitigation site, and detail groundcover, shrub, and tree coverage and species survival. At least two photo points will be established, from which photos of the mitigation site shall be taken throughout the monitoring period. Photo point locations and directions must be identified on the as-built map (may be hand drawn on approved maps/plans). Vegetation monitoring shall occur annually between August 1 and September 30 (prior to leaf drop), unless otherwise specified.

### **5.4.2 Monitoring Reports**

Monitoring reports shall be submitted by December 31 of each year during the monitoring period. As applicable, monitoring reports must include descriptions/data for:

- (1) Site plan and vicinity map;
- (2) Historic description of project, including date of installation, current year of monitoring, restatement of planting/restoration goals, and performance standards;
- (3) Plant survival, vigor, and areal coverage for every plant stratum (sampling point data), and explanation of monitoring methodology in the context of assessing performance standards;
- (4) Slope condition and site stability;
- (5) Overall buffer conditions, e.g., surrounding land use, use by humans and/or wildlife;
- (6) Observed wildlife, including amphibian, avian, and others;
- (7) Assessment of invasive biota and recommendations for management;
- (8) Color photographs taken from permanent photo points that shall be depicted on the monitoring report map.

### **5.4.3 Project Success and Compliance**

Upon installation and completion of the approved mitigation plan, an inspection by a qualified ecologist and/or City will be made to determine plan compliance. A compliance report will be supplied to the City of Bellevue within 30 days of the completion of planting. The Applicant or consulting ecologist/landscape designer will perform condition monitoring of the plantings before October of each year for five years. A written report describing the monitoring results will be submitted to the City after each site inspection of each monitored year, submitted no later than December 31<sup>st</sup> of each monitored year. Final inspection will occur five years after completion of this project, and a report on overall project its success will be prepared.

### *Performance Standards*

Project success will be measured by native species survival and richness, and areal cover of native and invasive plants. The mitigation area must achieve the following Performance Standards to be considered successful:

	<b>Year 1</b>	<b>Year 3</b>	<b>Year5</b>
<b>Native Plant Survival</b>	100%	90%	80%
<b>Invasive/Non-native species cover</b>	<5%	<5%	<5%
<b>Species Richness (# species present)</b>	9	8	8

### *Assurance Device*

The City of Bellevue may require a performance or maintenance assurance device if it is determined to be necessary. The City will determine the type and amount of assurance device required. The performance or maintenance assurance device amount is typically determined from the estimated cost of work. An estimate of the cost of project installation is provided below.

Cost of Plants and Labor	\$1,732.50
1-gal pots (\$11.50 per plant)= 105	
4-inch pots (\$5 per plant)= 60	
B&B (balled & burlapped) (\$75 per plant)= 3	
Cost of Silt Fence (\$1.60/linear foot)	\$132.80
Cost of Mulch (\$3.25/sq.yd.)	\$500.00
<b>TOTAL ESTIMATED COST</b>	<b>\$2,364.50</b>

## **5.5 MAINTENANCE PROGRAM**

The planting areas will require periodic maintenance to remove undesirable species and replace vegetation mortality. Maintenance shall occur twice a year for the 5-year monitoring period in accordance with the approved plan. Maintenance may include, but will not be limited to, removal of competing grasses, irrigation, replacement of plant mortality, and the replacement of mulch for each maintenance period. The Applicant is responsible for maintenance in all monitoring years.

### *Duration and Extent*

In order to achieve performance standards, the Permittee shall have the planting area maintained for the duration of the five-year monitoring period. Maintenance will include: watering, weeding around the base of installed plants, pruning, replacement, re-staking, removal of all classes of noxious weeds (see Washington State Noxious Weeds List), and any other measures needed to insure plant survival.

### *Survival*

The Permittee shall be responsible for the health of 100 percent of all newly installed plants for *one growing season* after installation has been accepted by the City. A growing season for these purposes is defined as occurring from spring to spring (March 15 to March 15 of the following year). For fall installation (often required), the growing season will begin the following spring.

The Permittee shall replace any plants that are failing, weak, defective in manner of growth, or dead during this growing season.

#### *Installation Timing for Replacement Plants*

Replacement plants shall be installed between October 1 and March 1, unless otherwise determined by the landscape designer and/or City staff.

#### *Standards for Replacement Plants*

Replacement plants shall meet the same standards for size and type as those specified for the original installation unless otherwise directed by the landscape designer, consulting ecologist, and/or City staff.

#### *Mulch*

All plantings will have mulch reapplied at their bases for at least the first two growing years of the monitoring period. Plants shall receive no less than 3 inches of wood chips (a.k.a. arborist mulch). Mulch shall be kept well away (at least 2 inches) from the trunks and stems of woody plants.

#### *Herbicides/Pesticides*

Chemical controls shall not be used in the planting area, sensitive areas, or their buffers. However, limited use of herbicides may be approved depending on site-specific conditions, only if approved by City staff and the consulting ecologist.

#### *Watering/Irrigation*

Water should be provided during the dry season (~July 1 through September 15) to insure plant survival and establishment. Water should be applied at a rate of one inch of water twice per week during the dry season. The landscaping contractor will determine if additional watering is necessary.

### **5.6 CONTINGENCY PLAN**

If, during any of the annual inspections, performance standards are not being met for species survival, additional plants of the same species will be added to the mitigation area. If invasive, non-native species exceed 5 percent cover (as measured by areal cover), manual control shall occur. If any of these situations persist to the next inspection, a meeting with the landscape designer/consulting ecologist and the Permittee will be held to decide upon contingency plans. Elements of a contingency plan may include, but will not be limited to: more aggressive weed control, mulching, replanting with larger plant material, species substitution, fertilization, soil amendments, and/or irrigation.

### **6.0 USE OF THIS REPORT**

This Critical Area Report and Buffer Mitigation Plan is supplied to David Lu as a means of determining on-site critical area conditions and mitigating for project impacts, as required by the

City of Bellevue during the permitting process. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions.

The laws applicable to wetlands are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information deemed relevant in the applicant's attempt to comply with the laws now in effect.

The work for this report has conformed to the standard of care employed by wetland ecologists. No other representation or warranty is made concerning the work or this report, and any implied representation or warranty is disclaimed.

*Wetland Resources, Inc.*

A handwritten signature in black ink, appearing to read 'Jeff Mallahan', with a stylized, cursive script.

Jeff Mallahan  
*Senior Wetland Ecologist*

## 7.0 REFERENCES

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# **APPENDIX A**

GEOTECHNICAL REPORT BY MIGIZI GROUP,  
INC. (DATED MARCH 8, 2018)

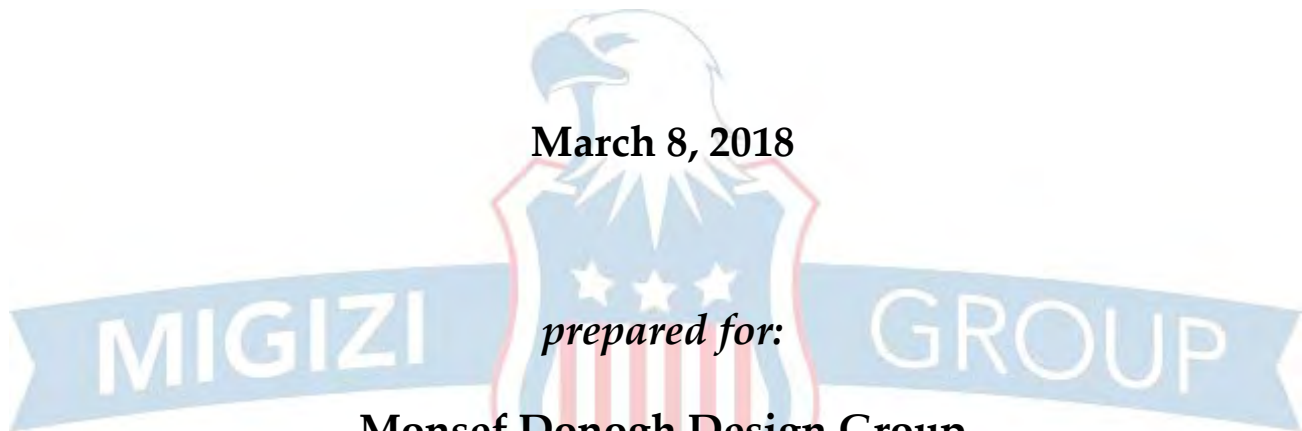
PLAN REVIEW LETTER BY MIGIZI GROUP, INC.  
(DATED JANUARY 25, 2019)

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# Geotechnical Engineering Report

**Proposed Lu Residence  
13632 SE 37<sup>th</sup> St  
Bellevue, Washington 98006  
P/N 220650-0030**

**March 8, 2018**



*prepared for:*

**Monsef Donogh Design Group**

Attention: Paul Monsef  
2806 NE Sunset Blvd, Suite F  
Renton, Washington 98056

*prepared by:*

**Migizi Group, Inc.**  
PO Box 44840  
Tacoma, Washington 98448  
(253) 537-9400

**MGI Project P1222-T18**

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## MIGIZI GROUP, INC.

PO Box 44840  
Tacoma, Washington 98448

PHONE (253) 537-9400  
FAX (253) 537-9401

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March 8, 2018

Monsef Donogh Design Group  
2806 NE Sunset Blvd, Suite F  
Renton, Washington 98056

Attention: Paul Monsef

**Subject: Geotechnical Engineering Report**  
Proposed Lu Residence  
13632 SE 37<sup>th</sup> St  
Bellevue, Washington 98006  
P/N 220650-0030

MGI Project P1222-T18

Dear Mr. Monsef:

Migizi Group, Inc. (MGI) is pleased to submit this report describing the results of our geotechnical engineering evaluation of the proposed residential development at the above referenced address in Bellevue, Washington.

This report has been prepared for the exclusive use of Monsef Donogh Design Group, and their consultants, for specific application to this project, in accordance with generally accepted geotechnical engineering practice.

### **1.0 SITE AND PROJECT DESCRIPTION**

The project site consists of a fully developed, 0.19-acre residential parcel in Bellevue, Washington, as shown on the enclosed Topographic and Location Map (Figure 1). The subject property is rectangularly-shaped, being orientated lengthwise from north to south, spanning approximately 113 feet along this orientation, and extending upwards of 72 feet from east to west; encompassing a total area of 0.19-acres. The central portion of the site is occupied by an existing residence and detached garage originally constructed in 1960. The northern and southern margins of the project area are occupied by yard space.

Improvement plans involve the demolition of existing site features, and the construction of a new single-family residence within the confines of the parcel. Roof runoff water will be retained on site if feasible.

## 2.0 EXPLORATORY METHODS

We explored surface and subsurface conditions at the project site on February 21, 2018. Our exploration and evaluation program comprised the following elements:

- Surface reconnaissance of the site;
- One test pit exploration (designated TP-1), advanced on February 21, 2018;
- One grain-size analysis performed on a soil sample collected from our subsurface exploration;
- One Small-Scale Pilot Infiltration Test (PIT), performed on February 21, 2018; and
- A review of published geologic and seismologic maps and literature.

Table 1 summarizes the approximate functional location and termination depth of our subsurface exploration, and Figure 2 depicts the approximate relative location. The following sections describe the procedures used for excavation of the test pit.

TABLE 1 APPROXIMATE LOCATION AND DEPTH OF EXPLORATION		
Exploration	Functional Location	Termination Depth (feet)
TP-1	South side of existing detached garage	10

The specific number and location of our exploration was selected in relation to the existing site features, under the constraints of surface access, underground utility conflicts, and budget considerations.

It should be realized that the exploration performed and utilized for this evaluation reveals subsurface conditions only at discrete locations across the project site and that actual conditions in other areas could vary. Furthermore, the nature and extent of any such variations would not become evident until additional explorations are performed or until construction activities have begun. If significant variations are observed at that time, we may need to modify our conclusions and recommendations contained in this report to reflect the actual site conditions.

### 2.1 Test Pit Procedures

Our exploratory test pit was excavated with a rubber-tracked mini-excavator operated by an excavation contractor under subcontract to MGI. An engineering geologist from our firm observed the test pit excavation, collected soil samples, and logged the subsurface conditions.

The enclosed test pit log indicates the vertical sequence of soils and materials encountered in our test pit, based on our field classifications. Where a soil contact was observed to be gradational or undulating, our log indicates the average contact depth. We estimated the relative density and consistency of the in-situ soils by means of the excavation characteristics and the stability of the test pit sidewalls. Our log also indicates the approximate depths of any sidewall caving or groundwater

seepage observed in the test pit. The soils were classified visually in general accordance with the system described in Figure A-1, which includes a key to the exploration log. A summary log of our exploration is included as Figure A-2.

## **2.2 Infiltration Test Procedures**

In-situ field infiltration testing was performed for determination of a Design Infiltration Rate in general accordance with the Small-Scale PIT test procedures, as described in Volume III, Section 3.3.6 of the 2014 Stormwater Management Manual for Western Washington (SWMMWW), as recommended by the 2017 Surface Water Engineering Standards for the City of Bellevue. The first step of this test procedure was to identify a suitable soil stratum for stormwater retention, and once completed, perform an excavation within this soil group with a minimum surface area of 12 square feet (sf). Once the excavation was completed, a vertical measuring rod marked in half-inch increments was installed towards the center of the test area. Water was then introduced into the test area, being conveyed through a 4-inch corrugated pipe to a splash block at the bottom of the excavation. Once 12 inches of water was developed at the bottom of the excavation, the test surface was saturated prior to testing. After the saturation period was completed, a steady state flow rate was developed in order to maintain 12 inches of head at the bottom of the test surface. This steady state rate was maintained for one hour. After completion of the steady state period, water was no longer introduced into the excavation, and infiltration of the existing water was allowed. We recorded the falling head rate for one hour, for comparison with the steady state rate.

## **3.0 SITE CONDITIONS**

The following sections present our observations, measurements, findings, and interpretations regarding, surface, soil, groundwater, and infiltration conditions.

### **3.1 Surface Conditions**

As previously indicated, the project site consists of a fully developed, 0.19-acre residential parcel located along the north side of SE 37<sup>th</sup> Street in Bellevue, Washington. The parcel is situated within a densely populated residential area between Factoria (to the west) and Eastgate (to the east), with the project area being bound on the east and west by developed residential sites and on the north by a large commercial complex. The central portion of the site is occupied by the existing residence and detached garage originally constructed in 1960, with the northern and southern margins of the site containing yard space.

Topographically, the project area is relatively level, with minimal grade change being observed over its extent. The transition between the project area, adjacent residential sites, and the commercial complex to the north, however, is marked by a 15-foot high slope, which contains localized gradients of  $\pm 50$  percent. This region is considered a Steep Slope Geologic Hazard Area by City of Bellevue land use codes, as described by LUC 20.25H.120. During our reconnaissance of the site, no irregularities indicating slope failure, such as ancient or recent landslide scarps, hummocks, slide blocks, or jack-strawed trees, were observed within this sloped region offsite. Based on our observations, it is our opinion that this region is currently in a stable configuration, and minimal buffers and/or setbacks need be implemented to address this hazard.

Vegetation onsite is limited to lawn grass and ornamental trees and/or shrubs. The sloped region immediately north of the project area is densely vegetated. No hydrologic features were observed on site, such as seeps, springs, ponds and streams.

### **3.2 Soil Conditions**

Our test pit exploration encountered, underlying a surface mantle of sod and topsoil, native soils comprising loose to moderately consolidated, Vashon-aged recessional outwash consisting of fine to medium sand with some silt and gravel.

Bellevue, and the larger Puget Sound area in general, has been glaciated a number of times over the last 2.4 million years. The most recent of these glacial events, the Vashon Stade of the Fraser Glaciation, receded from this region approximately 13,500 years ago. The majority of near surface soils encountered within the Bellevue area are either directly associated with or have been physically altered by the Vashon glacial event. Recessional outwash deposits generally consist of variably consolidated sands and gravels deposited along meltwater streams/rivers during the latter end of a glacial event, during an extended period of ablation and regression of glacial ice.

In the *Geological Map of Surficial Deposits in the Seattle 30'x60' Quadrangle, Washington*, as prepared by the Department of the Interior United States Geological Survey (USGS) (1993), the project site is mapped as containing Qvr, or Vashon-aged recessional outwash. The National Cooperative Soil Survey (NCSS) for the King County area, classifies soils on site as either InC-Indianola loamy sand, 5 to 15 percent slopes, or An-Arents, Everett material. The Indianola soil series is mapped across much of the site, with the Arents soil series being limited to the northern margin of the project. These soil series reportedly formed from sandy glacial outwash. Our subsurface exploration generally corresponds with the mappings of the site performed by the USGS and NCSS.

The enclosed exploration log (Appendix A) provides a detailed description of the soil strata encountered in our subsurface exploration.

### **3.3 Groundwater Conditions**

We did not encounter any groundwater seepage in our subsurface exploration, which extended to a maximum depth of 10 feet below existing grade. Given the fact that our exploration was performed inside of what is generally considered the rainy season, we do not anticipate that groundwater levels will rise higher than that which we observed, nor be a limiting factor in the proposed development.

### **3.4 Infiltration Conditions**

As indicated in the *Soil Conditions* section of this report, the site is underlain by fine to medium sand with some silt and gravel. This soil group should be considered a Type A soil type and, in our opinion, can support full infiltration of roof-runoff.

On February 21, 2018, an engineering geologist from MGI performed field infiltration testing utilizing the procedures described at the onset of this report. The field test (INF-1) was performed adjacent to the existing driveway, immediately northwest of test pit exploration TP-1, as indicated

in the attached Figure 2. As described in the Infiltration Test Procedures section of this report, there are two complementary portions of the Small PIT test procedure utilized to determine a field infiltration rate; the steady-state period and the falling head period. In our experience, the falling head period is generally more conservative, and provides a more accurate evaluation of infiltration conditions. The results of the falling head portion of our Small PIT test is recorded below in Table 2.

TABLE 2 FALLING HEAD PERIOD TEST RESULTS		
Test Pit Exploration	Depth of Test Surface (feet)	Field Infiltration Rate (in/hr)
INF-1	2	12

A design infiltration rate is determined by applying an appropriate correction factor to the measured infiltration rate. As described in the SWMMWW, this total correction factor ( $CF_T$ ) should be equal to:

$$CF_T = CF_v \times CF_t \times CF_m$$

Where  $CF_v$  accounts for site variability and number of locations tested,  $CF_t$  accounts for uncertainty with the test method, and  $CF_m$  accounts for siltation and biofouling. The SWMM recommends utilizing a value between 0.33 and 1 for  $CF_v$ , a value of 0.5 for  $CF_t$ , and a value of 0.9 for  $CF_m$ . For this evaluation we utilized a value of 0.75 for  $CF_v$ , giving us a  $CF_T = 0.34$ . Applying this value to our measured infiltration rate, we recommend utilizing a design infiltration rate of **4.0 inches per hour** for retention facilities constructed utilizing the native, granular, recessional outwash deposits as the primary infiltrative medium. This material is present within two feet of existing grade.

### 3.5 Seismic Conditions

Based on our analysis of subsurface exploration logs and our review of published geologic maps, we interpret the onsite soil conditions to generally correspond with site class D, as defined by Table 30.2-1 in ASCE 7, per the 2015 *International Building Code (IBC)*.

Using 2015 IBC information on the USGS Design Summary Report website, Risk Category I/II/III seismic parameters for the site are as follows:

$S_s = 1.357 \text{ g}$	$S_{MS} = 1.357 \text{ g}$	$S_{DS} = 0.904 \text{ g}$
$S_1 = 0.519 \text{ g}$	$S_{M1} = 0.779 \text{ g}$	$S_{D1} = 0.519 \text{ g}$

Using the 2015 IBC information,  $MCE_R$  Response Spectrum Graph on the USGS Design Summary Report website, Risk Category I/II/III,  $S_a$  at a period of 0.2 seconds is 1.36 g and  $S_a$  at a period of 1.0 seconds is 0.78 g.

The Design Response Spectrum Graph from the same website, using the same IBC information and Risk Category,  $S_a$  at a period of 0.2 seconds is 0.90 g and  $S_a$  at a period of 1.0 seconds is 0.52 g.

### **3.6 Liquefaction Potential**

Liquefaction is a sudden increase in pore water pressure and a sudden loss of soil shear strength caused by shear strains, as could result from an earthquake. Research has shown that saturated, loose, fine to medium sands with a fines (silt and clay) content less than about 20 percent are most susceptible to liquefaction. No saturated, poorly consolidated granular soils were encountered throughout the course of our test pit exploration. We interpret site soils as having a low potential of liquefying during a large-scale seismic event.

## **4.0 CONCLUSIONS AND RECOMMENDATIONS**

Improvement plans involve the demolition of existing site features, and the construction of a new single-family residence within the confines of the parcel. Roof runoff water will be retained on site if feasible. We offer these recommendations:

- Feasibility: Based on our field exploration, research and analyses, the proposed structure appears feasible from a geotechnical standpoint.
- Foundation Options: Foundation elements for the proposed residence should be constructed on medium dense or denser undisturbed native soils, or on structural fill bearing pads extending down to these soils. We anticipate that adequate bearing soils will be encountered within two to three feet of existing grade. Recommendations for Spread Footings are provided in Section 4.2.
- Floor Options: Floor sections for the proposed residence should bear on medium dense or denser native soils or on properly compacted structural fill extending down to these soils. We anticipate that adequate bearing soils will be encountered within two to three feet of existing grade. Recommendations for slab-on-grade floors are included in Section 4.3. Fill underlying floor slabs should be compacted to 95 percent (ASTM:D-1557).
- Pavement Sections: Native, in-situ soil conditions are amenable to the use of soil-supported pavements. We recommend a conventional pavement section comprised of an asphalt concrete pavement over a crushed rock base course over a properly prepared (compacted) subgrade or a granular subbase, depending on subgrade conditions during pavement subgrade preparation.

All soil subgrades should be thoroughly compacted, then proof-rolled with a loaded dump truck or heavy compactor. Any localized zones of yielding subgrade disclosed during this proof-rolling operation should be over-excavated to a depth of 12 inches and replaced with a suitable structural fill material.

- Infiltration Conditions: Given the geological conditions encountered on site, we interpret full-infiltration as being feasible for this project, utilizing native, granular outwash as the primary infiltrative unit. This material is encountered within 2 feet of existing grade. We recommend utilizing a design infiltration rate of **4 inches per hour** for this soil group.
- Geologic Hazards: As indicated in the *Surface Conditions* section of this report, the 15-foot high,  $\pm$  50 percent slope immediately north of the project area is considered a

Steep Slope Geologic Hazard Area, as described in LUC 20.25H.120. We do not interpret this region as being particularly hazardous, and recommend implementing and maintaining a 10-foot Steep Slope buffer area from the crest of the slope, and a minimum 5-foot structural setback from the aforementioned buffer area.

The following sections of this report present our specific geotechnical conclusions and recommendations concerning site preparation, spread footings, slab-on-grade floors, asphalt pavement, and structural fill. The Washington State Department of Transportation (WSDOT) Standard Specifications and Standard Plans cited herein refer to WSDOT publications M41-10, *Standard Specifications for Road, Bridge, and Municipal Construction*, and M21-01, *Standard Plans for Road, Bridge, and Municipal Construction*, respectively.

#### **4.1 Site Preparation**

Preparation of the project site should involve erosion control, temporary drainage, clearing, stripping, excavations, cutting, subgrade compaction, and filling.

Erosion Control: Before new construction begins, an appropriate erosion control system should be installed. This system should collect and filter all surface water runoff through silt fencing. We anticipate a system of berms and drainage ditches around construction areas will provide an adequate collection system. Silt fencing fabric should meet the requirements of WSDOT Standard Specification 9-33.2 Table 3. In addition, silt fencing should embed a minimum of 6 inches below existing grade. An erosion control system requires occasional observation and maintenance. Specifically, holes in the filter and areas where the filter has shifted above ground surface should be replaced or repaired as soon as they are identified.

Temporary Drainage: We recommend intercepting and diverting any potential sources of surface or near-surface water within the construction zones before stripping begins. Because the selection of an appropriate drainage system will depend on the water quantity, season, weather conditions, construction sequence, and contractor's methods, final decisions regarding drainage systems are best made in the field at the time of construction. Based on our current understanding of the construction plans, surface and subsurface conditions, we anticipate that curbs, berms, or ditches placed around the work areas will adequately intercept surface water runoff.

Clearing and Stripping: After surface and near-surface water sources have been controlled, sod, topsoil, and root-rich soil should be stripped from the site. Our subsurface exploration indicates that the organic horizon can reach thicknesses of up to 5 inches. Stripping is best performed during a period of dry weather.

Site Excavations: Based on our exploration, we expect shallow excavations will encounter poorly to moderately consolidated sands and gravels, which can be readily excavated using standard excavation equipment.

Dewatering: We did not encounter groundwater seepage in our test pit exploration, which extended a maximum depth of 10 feet below existing grade. Given the fact that our exploration was

performed inside of what is generally considered the rainy season, we do not anticipate that groundwater levels will rise higher than that which we observed, nor be a limiting factor in the proposed development. However, if groundwater is encountered, we anticipate that an internal system of ditches, sump holes, and pumps will be adequate to temporarily dewater excavations.

Temporary Cut Slopes: All temporary soil slopes associated with site cutting or excavations should be adequately inclined to prevent sloughing and collapse. Temporary cut slopes in site soils should be no steeper than 1½H:1V, and should conform to Washington Industrial Safety and Health Act (WISHA) regulations.

Subgrade Compaction: Exposed subgrades for the foundation of the proposed residence should be compacted to a firm, unyielding state before new concrete or fill soils are placed. Any localized zones of looser granular soils observed within a subgrade should be compacted to a density commensurate with the surrounding soils. In contrast, any organic, soft, or pumping soils observed within a subgrade should be overexcavated and replaced with a suitable structural fill material.

Site Filling: Our conclusions regarding the reuse of onsite soils and our comments regarding wet-weather filling are presented subsequently. Regardless of soil type, all fill should be placed and compacted according to our recommendations presented in the Structural Fill section of this report. Specifically, building pad fill soil should be compacted to a uniform density of at least 95 percent (based on ASTM:D-1557).

Onsite Soils: We offer the following evaluation of these onsite soils in relation to potential use as structural fill:

- Surficial Organic Soil and Organic-Rich Fill Soils: Where encountered, surficial organic soils like duff, topsoil, root-rich soil, and organic-rich fill soils are *not* suitable for use as structural fill under any circumstances, due to high organic content. Consequently, this material can be used only for non-structural purposes, such as in landscaping areas.
- Recessional Outwash (Granular): Encountered within close proximity to existing grade, extending through the termination depth of our test pit exploration, we encountered granular outwash soils. This material type is relatively impervious to moisture content variations and can adequately be reused as structural fill under most weather conditions.

Permanent Slopes: All permanent cut slopes and fill slopes should be adequately inclined to reduce long-term raveling, sloughing, and erosion. We generally recommend that no permanent slopes be steeper than 2H:1V. For all soil types, the use of flatter slopes (such as 2½H:1V) would further reduce long-term erosion and facilitate revegetation.

Slope Protection: We recommend that a permanent berm, swale, or curb be constructed along the top edge of all permanent slopes to intercept surface flow. Also, a hardy vegetative groundcover should be established as soon as feasible, to further protect the slopes from runoff water erosion. Alternatively, permanent slopes could be armored with quarry spalls or a geosynthetic erosion mat.

#### **4.2 Spread Footings**

In our opinion, conventional spread footings will provide adequate support for the proposed residence if the subgrade is properly prepared. We offer the following comments and recommendations for spread footing design.

Footing Depths and Widths: For frost and erosion protection, the bases of all exterior footings should bear at least 18 inches below adjacent outside grades, whereas the bases of interior footings need bear only 12 inches below the surrounding slab surface level. To reduce post-construction settlements, continuous (wall) and isolated (column) footings should be at least 16 and 24 inches wide, respectively.

Bearing Subgrades: Footings should bear on medium dense or denser, undisturbed native soils which have been stripped of surficial organic soils and vigorously surface compacted, or on properly compacted structural fill bearing pads which extend down to soils described above. We anticipate that adequate bearing subgrades will be encountered within 2 to 3 feet of existing grade, within existing fill and/or outwash soils.

In general, before footing concrete is placed, any localized zones of loose soils exposed across the footing subgrades should be compacted to a firm, unyielding condition, and any localized zones of soft, organic, or debris-laden soils should be over-excavated and replaced with suitable structural fill.

Lateral Overexcavations: Because foundation stresses are transferred outward as well as downward into the bearing soils, all structural fill placed under footings should extend horizontally outward from the edge of each footing. This horizontal distance should be equal to the depth of placed fill. Therefore, placed fill that extends 3 feet below the footing base should also extend 3 feet outward from the footing edges.

Subgrade Observation: All footing subgrades should consist of firm, unyielding, native soils, or structural fill materials that have been compacted to a density of at least 95 percent (based on ASTM:D-1557). Footings should never be cast atop loose, soft, or frozen soil, slough, debris, existing uncontrolled fill, or surfaces covered by standing water.

Bearing Pressures: In our opinion, for static loading, footings that bear on moderately consolidated recessional outwash soils can be designed for a maximum allowable soil bearing pressure of 2,000 psf. A one-third increase in allowable soil bearing capacity may be used for short-term loads created by seismic or wind related activities.

Footing Settlements: Assuming that structural fill soils are compacted to a medium dense or denser state, we estimate that total post-construction settlements of properly designed footings bearing on properly prepared subgrades will not exceed 1 inch. Differential settlements for comparably loaded elements may approach one-half of the actual total settlement over horizontal distances of approximately 50 feet.

**Footing Backfill:** To provide erosion protection and lateral load resistance, we recommend that all footing excavations be backfilled on both sides of the footings and stemwalls after the concrete has cured. Either imported structural fill or non-organic onsite soils can be used for this purpose, contingent on suitable moisture content at the time of placement. Regardless of soil type, all footing backfill soil should be compacted to a density of at least 90 percent (based on ASTM:D-1557).

**Lateral Resistance:** Footings that have been properly backfilled as recommended above will resist lateral movements by means of passive earth pressure and base friction. We recommend using an allowable passive earth pressure of 225 psf and an allowable base friction coefficient of 0.35 for site soils.

#### **4.3 Slab-On-Grade Floors**

In our opinion, soil-supported slab-on-grade floors can be used in the proposed residence if the subgrades are properly prepared. Floor sections for the proposed structure should bear on medium dense or denser native soils or on properly compacted structural fill which extends down to soils described above. We anticipate that adequate bearing soils will be encountered within 2 to 3 feet of existing grade. We offer the following comments and recommendations concerning slab-on-grade floors.

**Floor Subbase:** Surface compaction of all slab subgrades is recommended. If a subbase is required, it should be compacted to a density of at least 95 percent (based on ASTM:D-1557).

**Capillary Break and Vapor Barrier:** To retard the upward wicking of moisture beneath the floor slab, we recommend that a capillary break be placed over the subgrade. Ideally, this capillary break would consist of a 4-inch-thick layer of pea gravel or other clean, uniform, well-rounded gravel, such as “Gravel Backfill for Drains” per WSDOT Standard Specification 9-03.12(4), but clean angular gravel can be used if it adequately prevents capillary wicking. In addition, a layer of plastic sheeting (such as Crosstuff, Visqueen, or Moistop) should be placed over the capillary break to serve as a vapor barrier. During subsequent casting of the concrete slab, the contractor should exercise care to avoid puncturing this vapor barrier.

**Vertical Deflections:** Due to elastic compression of subgrades, soil-supported slab-on-grade floors can deflect downwards when vertical loads are applied. In our opinion, a subgrade reaction modulus of 250 pounds per cubic inch can be used to estimate such deflections.

#### **4.4 Asphalt Pavement**

Since asphalt pavements will also be used for the proposed driveway, we offer the following comments and recommendations for pavement design and construction.

**Subgrade Preparation:** All soil subgrades should be thoroughly compacted, then proof-rolled with a loaded dump truck or heavy compactor. Any localized zones of yielding subgrade disclosed during this proof-rolling operation should be over excavated to a maximum depth of 12 inches and replaced with a suitable structural fill material. All structural fill should be compacted according to our recommendations given in the Structural Fill section. Specifically, the upper 2 feet of soils

underlying pavement section should be compacted to at least 95 percent (based on ASTM D-1557), and all soils below 2 feet should be compacted to at least 90 percent.

**Pavement Materials:** For the base course, we recommend using imported washed crushed rock, such as "Crushed Surfacing Base Course" per WSDOT Standard Specification 9-03.9(3) but with a fines content of less than 5 percent passing the No. 200 Sieve. Although our exploration does not indicate a need for a pavement subbase, if a subbase course is needed, we recommend using imported, clean, well-graded sand and gravel such as "Ballast" or "Gravel Borrow" per WSDOT Standard Specifications 9-03.9(1) and 9-03.14, respectively.

**Conventional Asphalt Sections:** A conventional pavement section typically comprises an asphalt concrete pavement over a crushed rock base course. We recommend using the following conventional pavement sections:

<b><u>Pavement Course</u></b>	<b><u>Minimum Thickness</u></b>	
	<b>Parking Areas</b>	<b>High Traffic Driveways</b>
Asphalt Concrete Pavement	2 inches	4 inches
Crushed Rock Base	4 inches	8 inches
Granular Fill Subbase (if needed)	6 inches	12 inches

**Compaction and Observation:** All subbase and base course material should be compacted to at least 95 percent of the Modified Proctor maximum dry density (ASTM D-1557), and all asphalt concrete should be compacted to at least 92 percent of the Rice value (ASTM D-2041). We recommend that an MGI representative be retained to observe the compaction of each course before any overlying layer is placed. For the subbase and pavement course, compaction is best observed by means of frequent density testing. For the base course, methodology observations and hand-probing are more appropriate than density testing.

**Pavement Life and Maintenance:** No asphalt pavement is maintenance-free. The above described pavement sections present our minimum recommendations for an average level of performance during a 20-year design life; therefore, an average level of maintenance will likely be required. Furthermore, a 20-year pavement life typically assumes that an overlay will be placed after about 10 years. Thicker asphalt and/or thicker base and subbase courses would offer better long-term performance but would cost more initially; thinner courses would be more susceptible to "alligator" cracking and other failure modes. As such, pavement design can be considered a compromise between a high initial cost and low maintenance costs versus a low initial cost and higher maintenance costs.

#### **4.5 Structural Fill**

The term "structural fill" refers to any material placed under foundations, retaining walls, slab-on-grade floors, sidewalks, pavements, and other structures. Our comments, conclusions, and recommendations concerning structural fill are presented in the following paragraphs.

Materials: Typical structural fill materials include clean sand, gravel, pea gravel, washed rock, crushed rock, well-graded mixtures of sand and gravel (commonly called "gravel borrow" or "pit-run"), and miscellaneous mixtures of silt, sand, and gravel. Recycled asphalt, concrete, and glass, which are derived from pulverizing the parent materials, are also potentially useful as structural fill in certain applications. Soils used for structural fill should not contain any organic matter or debris, nor any individual particles greater than about 6 inches in diameter.

Fill Placement: Clean sand, gravel, crushed rock, soil mixtures, and recycled materials should be placed in horizontal lifts not exceeding 8 inches in loose thickness, and each lift should be thoroughly compacted with a mechanical compactor.

Compaction Criteria: Using the Modified Proctor test (ASTM:D-1557) as a standard, we recommend that structural fill used for various onsite applications be compacted to the following minimum densities:

<b>Fill Application</b>	<b>Minimum Compaction</b>
Footing subgrade and bearing pad	95 percent
Foundation backfill	90 percent
Asphalt pavement base	95 percent
Asphalt pavement subgrade (upper 2 feet)	95 percent
Asphalt pavement subgrade (below 2 feet)	90 percent

Subgrade Observation and Compaction Testing: Regardless of material or location, all structural fill should be placed over firm, unyielding subgrades prepared in accordance with the Site Preparation section of this report. The condition of all subgrades should be observed by geotechnical personnel before filling or construction begins. Also, fill soil compaction should be verified by means of in-place density tests performed during fill placement so that adequacy of soil compaction efforts may be evaluated as earthwork progresses.

Soil Moisture Considerations: The suitability of soils used for structural fill depends primarily on their grain-size distribution and moisture content when they are placed. As the "fines" content (that soil fraction passing the U.S. No. 200 Sieve) increases, soils become more sensitive to small changes in moisture content. Soils containing more than about 5 percent fines (by weight) cannot be consistently compacted to a firm, unyielding condition when the moisture content is more than 2 percentage points above or below optimum. For fill placement during wet-weather site work, we recommend using "clean" fill, which refers to soils that have a fines content of 5 percent or less (by weight) based on the soil fraction passing the U.S. No. 4 Sieve.

## 5.0 RECOMMENDED ADDITIONAL SERVICES

Because the future performance and integrity of the structural elements will depend largely on proper site preparation, drainage, fill placement, and construction procedures, monitoring and testing by experienced geotechnical personnel should be considered an integral part of the construction process. Subsequently, we recommend that MGI be retained to provide the following post-report services:

- Review all construction plans and specifications to verify that our design criteria presented in this report have been properly integrated into the design;
- Prepare a letter summarizing all review comments (if required);
- Check all completed subgrades for footings and slab-on-grade floors before concrete is poured, in order to verify their bearing capacity; and
- Prepare a post-construction letter summarizing all field observations, inspections, and test results (if required).

## 6.0 CLOSURE

The conclusions and recommendations presented in this report are based, in part, on the exploration that we observed for this study; therefore, if variations in the subgrade conditions are observed at a later time, we may need to modify this report to reflect those changes. Also, because the future performance and integrity of the project elements depend largely on proper initial site preparation, drainage, and construction procedures, monitoring and testing by experienced geotechnical personnel should be considered an integral part of the construction process. MGI is available to provide geotechnical monitoring of soils throughout construction.

We appreciate the opportunity to be of service on this project. If you have any questions regarding this report or any aspects of the project, please feel free to contact our office.

Respectfully submitted,

**MIGIZI GROUP, INC.**

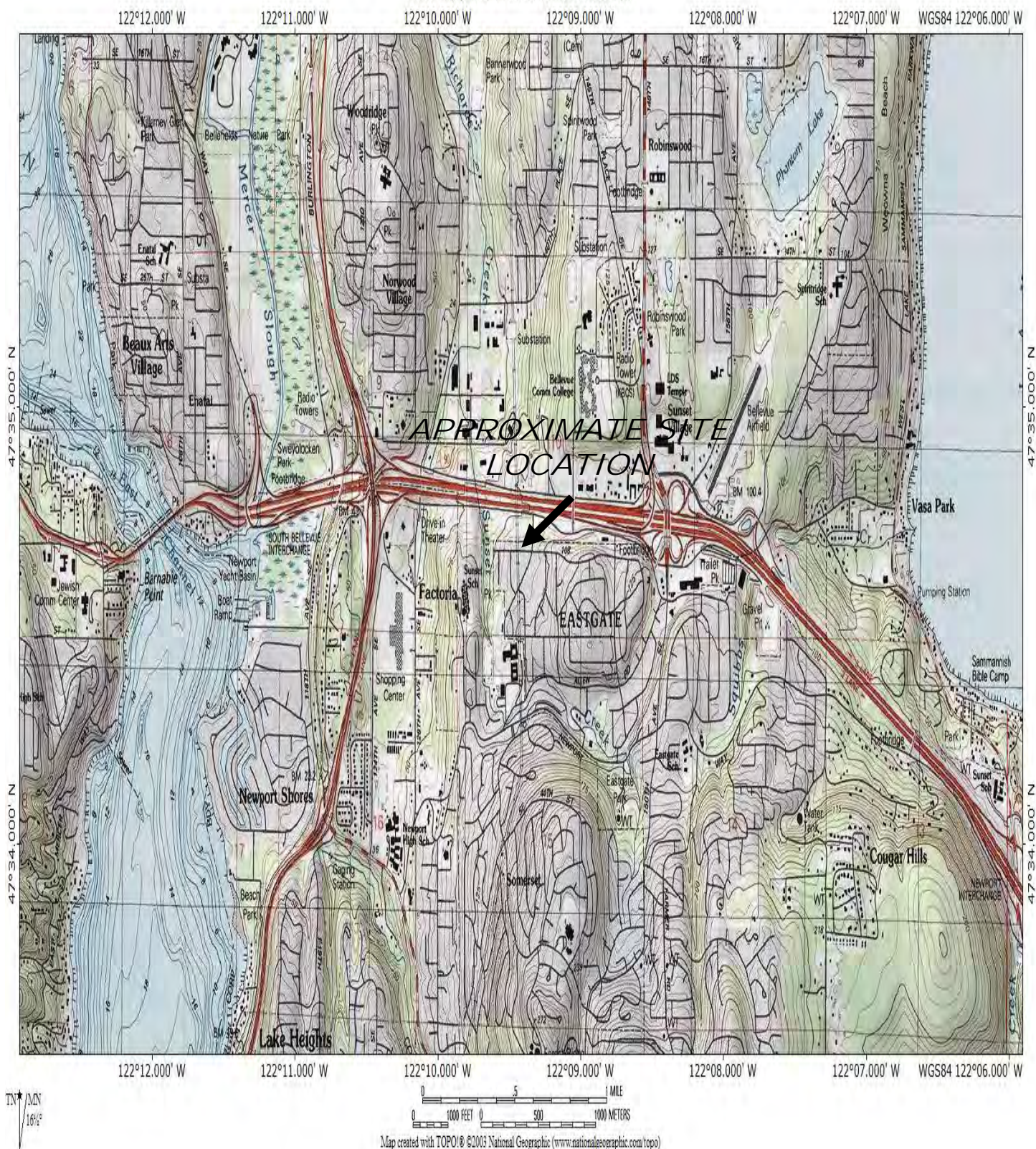


Zach L. Logan  
Staff Geologist



James E. Brigham, P.E.  
Principal Engineer

TOPO! map printed on 03/08/18 from "Untitled.topo"



**P.O. Box 44840  
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Location

**13632 SE 37<sup>th</sup> St  
Bellevue, WA  
P/N 220650-0030**

Job Number

**P1222-T18**

Figure

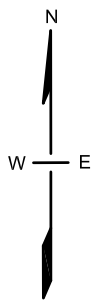
**1**

Title

**Topographic and Location Map**

Date

**03/08/18**



TEST PIT LOCATION



INFILTRATION TEST LOCATION



NOTE:  
BOUNDARY AND TOPOGRAPHY ARE BASED ON MAPPING  
PROVIDED TO MIGIZI OBSERVATIONS MADE IN THE FIELD.  
THE INFORMATION SHOWN DOES NOT CONSTITUTE A  
FIELD SURVEY BY MIGIZI.

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PROJECT: 13632 SE 37th St  
Bellevue, Washington

SHEET TITLE: Site and Exploration Plan

DESIGNER: JRB	JOB NO. P1222-T18
DRAWN BY: JRB	SCALE: NTS
CHECKED BY: JEB	FIGURE: 2
DATE: March 8, 2018	FILE: Fig2.dwg

**APPENDIX A**  
**SOIL CLASSIFICATION CHART AND**  
**KEY TO TEST DATA**

**LOG OF TEST PIT**

MAJOR DIVISIONS					TYPICAL NAMES
COARSE GRAINED SOILS More than Half > #200 sieve	GRAVELS  MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC		CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS  MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS, GRAVELLY SANDS
			SP		POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC		CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than Half < #200 sieve	SILTS AND CLAYS  LIQUID LIMIT LESS THAN 50		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL		ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS  LIQUID LIMIT GREATER THAN 50		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HIGHLY ORGANIC SOILS			Pt	



Modified California



Split Spoon



Pushed Shelby Tube



Auger Cuttings



Grab Sample



Sample Attempt with No Recovery

CA

Chemical Analysis

CN

Consolidation

CP

Compaction

DS

Direct Shear

PM

Permeability

PP

Pocket Penetrometer

RV

R-Value

SA

Sieve Analysis

SW

Swell Test

TC

Cyclic Triaxial

TX

Unconsolidated Undrained Triaxial

TV

Torvane Shear

UC

Unconfined Compression

(1.2)

(Shear Strength, ksf)

WA

Wash Analysis

(20)

(with % Passing No. 200 Sieve)



Water Level at Time of Drilling



Water Level after Drilling(with date measured)

## SOIL CLASSIFICATION CHART AND KEY TO TEST DATA


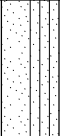

Figure A-1





PAGE 1 OF 1  
Figure A-2

<b>CLIENT</b> <u>Monsef Donogh Design Group</u>	<b>PROJECT NAME</b> <u>Proposed Lu Residence</u>
<b>PROJECT NUMBER</b> <u>P1222-T18</u>	<b>PROJECT LOCATION</b> <u>13632 SE 37th St, Bellevue, WA</u>
<b>DATE STARTED</b> <u>2/21/18</u> <b>COMPLETED</b> <u>2/21/18</u>	<b>GROUND ELEVATION</b> _____ <b>TEST PIT SIZE</b> _____
<b>EXCAVATION CONTRACTOR</b> <u>Paulman</u>	<b>GROUND WATER LEVELS:</b>
<b>EXCAVATION METHOD</b> <u>Rubber Tracked Mini Excavator</u>	<b>AT TIME OF EXCAVATION</b> <u>---</u>
<b>LOGGED BY</b> <u>ZLL</u> <b>CHECKED BY</b> <u>JEB</u>	<b>AT END OF EXCAVATION</b> <u>---</u>
<b>NOTES</b>	<b>AFTER EXCAVATION</b> <u>---</u>

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0				
	GB S-1			Sod and topsoil
		SP-SM		(SP-SM) Light brown fine to medium sand with silt (loose, moist) (Weathered Recessional Outwash)
2.5				(SP) Gray fine to medium sand with some gravel (medium dense, moist) (Unweathered Recessional Outwash)
5.0				
7.5				
10.0				

Severe caving observed from 2 to 10 feet  
No groundwater seepage observed

The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

Bottom of test pit at 10.0 feet.

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## MIGIZI GROUP, INC.

PO Box 44840  
Tacoma, Washington 98448

PHONE (253) 537-9400  
FAX (253) 537-9401

January 25, 2019

Monsef Donogh Design Group  
451 Duvall Ave NE, Suite 115  
Renton, Washington 98059

Attention: Paul Monsef

**Subject: Plan Review Letter**  
Lu Residence  
13632 SE 37<sup>th</sup> St  
Bellevue, Washington 98006  
P/N 220650-0030

MGI Project P1222-T18

Dear Mr. Monsef:

Migizi Group, Inc. (MGI) is pleased to submit this Plan Review Letter as it pertains to the proposed residential development at the above address in Bellevue, Washington. MGI has previously assisted in this project by preparing a Geotechnical Engineering Report for the proposed development; with a revised version being dated July 26, 2018. We will be acting as the Geotechnical Engineer of Record for this project and be performing construction monitoring services as needed.

Our scope of services is limited to a review of the *Site Plan B* prepared by Encompass Engineering & Surveying, dated October 5, 2018, associated review comments prepared by the City of Bellevue Development Review Committee (DRC), dated December 7, 2018, and the aforementioned Revised Geotechnical Engineering Report. This letter has been prepared for the exclusive use of Monsef Donogh Design Group, and their consultants, for specific application to this project, in accordance with generally accepted geotechnical practice.

### **SITE AND PROJECT DESCRIPTION**

The project site consists of a fully developed, 0.19-acre residential parcel in Bellevue, Washington. The subject property is rectangularly-shaped, being orientated lengthwise from north to south, spanning approximately 113 feet along this orientation, and extending upwards of 72 feet from east to west. The central portion of the site is occupied by an existing residence and detached

garage originally constructed in 1960. The northern and southern margins of the project area are occupied by yard space.

Topographically, the project area is relatively level, with minimal grade change being observed over its extent. The transition between the project area, adjacent residential sites, and the commercial complex to the north, however, is marked by a 15-foot high slope, which contains localized gradients of  $\pm 50$  percent. This region is considered a Steep Slope Geologic Hazard Area by City of Bellevue land use codes, as described by LUC 20.25H.120. During our reconnaissance of the site, no irregularities indicating slope failure, such as ancient or recent landslide scarps, hummocks, slide blocks, or jack-strawed trees, were observed within this sloped region offsite. Based on our observations and stability analyses outlined in our evaluation, it is our opinion that this region is currently in a stable configuration, and standard land use restrictions implemented to address this hazard type can be safely reduced.

Furthermore, our evaluation identified native soils as consisting of granular outwash soils, which can support stormwater retention at a design infiltration rate of 4 inches per hour.

Improvement plans involve the demolition of existing site features, and the construction of a new single-family residence within the confines of the parcel. The new residence will be setback a minimum distance of 15-feet from the crest of the aforementioned steeply-sloped area, as outlined in our geotechnical engineering report. This includes a 10-foot Landslide Hazard Buffer Area and a 5-foot structural setback from the buffer. Roof runoff water will be collected and diverted to an 8½' x 7' deep drywell towards the southeast corner of the parcel for retention.

## CONCLUSIONS AND RECOMMENDATIONS

Upon review of the documents listed at the onset of the report, we are of the opinion that recommendations contained in our geotechnical evaluation have been adequately incorporated into the project design prepared by Encompass Engineering & Surveying. The following are comments prepared by the City of Bellevue Development Review Committee (DRC) that we address specifically:

- #5. **Drainage** - *The site plan is showing a drain discharging on the north-east corner of the proposed structure into the 50-foot top of slope buffer/steep slope. This was not discussed in the geotechnical analysis. Please provide details of how this will function. If this will require an infiltration facility based on the geotechnical recommendations, then this facility needs to be located outside of the buffer area.*

Footing drains are typically a precaution against moisture problems induced by capillary actions of native soils, particularly within the vadose zone. Given the topographic setting of the project area and soil conditions onsite, we do not anticipate that the footing drains will catch and/or release a substantial quantity of water and believe that it can be discharged as outlined without the need for an infiltration gallery. The discharge point should be projected with an energy

dissipator to prevent localized erosion, typically constructed with 2-4-inch quarry spalls, or a similar material.

- #6. **Reduced Buffer Request** - Please explain why only a 10-foot buffer is being requested. What is the plan for the area behind the proposed home that would not be part of a buffer? There is no discussion of this in the Critical Areas Report. Remove the 5-foot structural setback as only a buffer is required by code.

It is our understanding that the bulk of this comment is being addressed by Encompass Engineering & Surveying. However, in regard to the removal of the 5-foot structural setback, we would then recommend increasing the Landslide Hazard Buffer Area from 10 to 15 feet, and to keep the spacing outlined in the provided site plan.

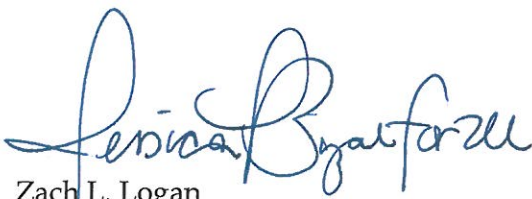
In our opinion, all portions of the site and adjacent properties that are disturbed or impacted by the proposed development will be stable or stabilized during construction and will continue to be stable after construction, provided that our geotechnical design recommendations are properly incorporated.


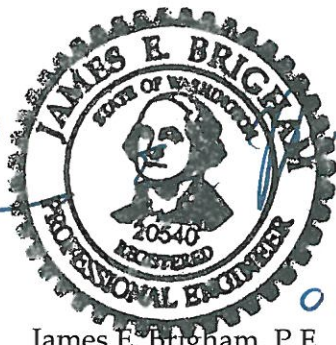
#### CLOSURE

We appreciate the opportunity to be of service on this project. If you have any questions regarding this letter or any aspects of the project, please feel free to contact our office.

Respectfully submitted,

**MIGIZI GROUP, INC.**

  
Zach L. Logan  
Staff Geologist

  
  
James E. Brigham, P.E.  
Senior Principal Engineer  
01-25-19

# **APPENDIX B**

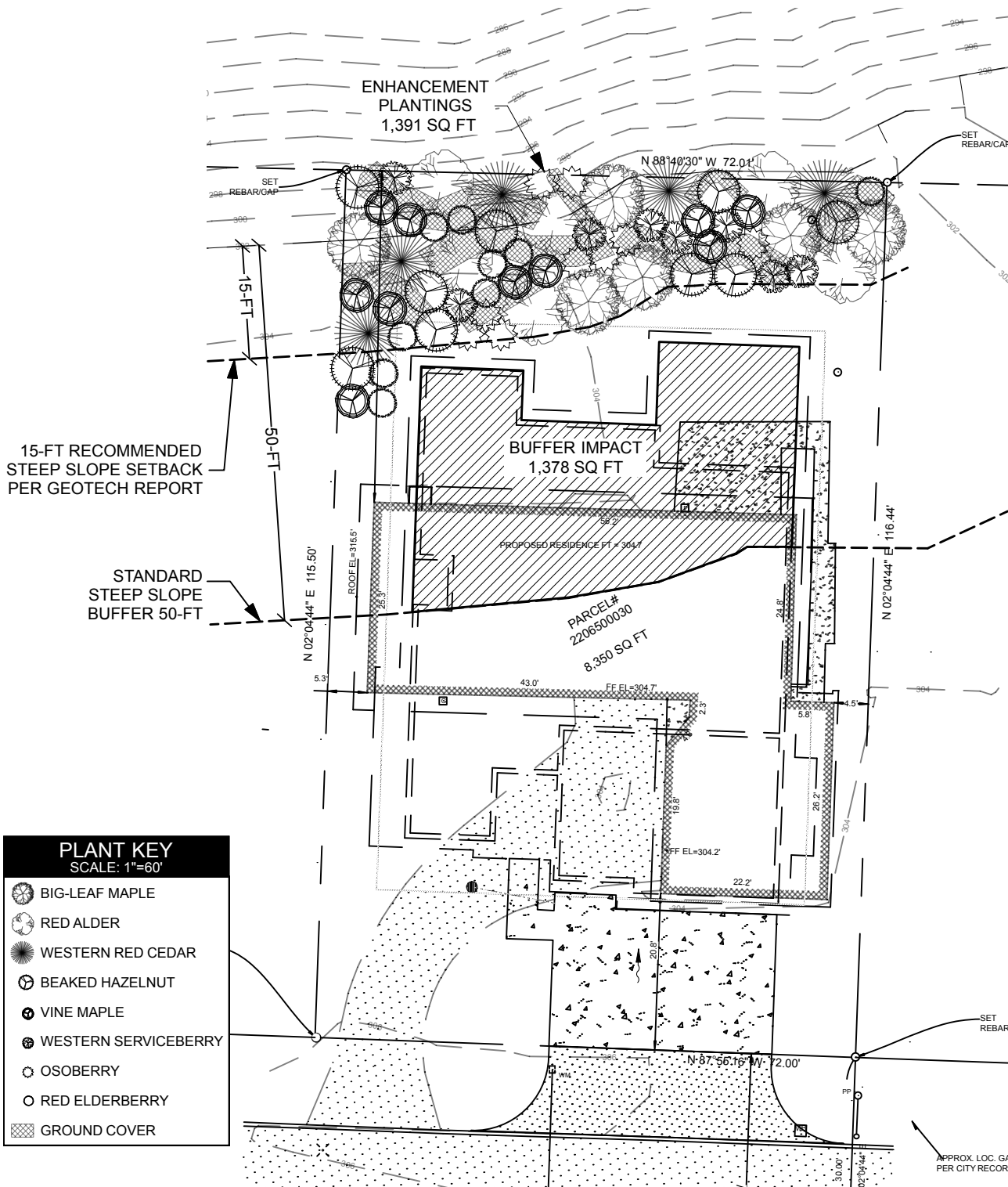
## **CRITICAL AREAS REPORT & MITIGATION PLAN MAP**

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# CRITICAL AREAS REPORT & BUFFER MITIGATION MAP

## Lu - SE 37th Street

PORTION OF SECTION 10, TOWNSHIP 24N, RANGE 05E, W.M.



**Wetland Resources, Inc.**

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue S.E. Suite 106 Everett, Washington 98208

Phone: (425) 337-3174

Fax: (425) 337-3045

Email: mailbox@wetlandresources.com

Proposed Use Map  
**Lu - Se 37th St**  
City Of Bellevue

Sheet 1/1

Project Number: 18270

Drawn by: JM & SW

5/02/2019

David Lu  
13414 SE 85th St.  
Bellevue, WA 98006

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# **APPENDIX C**

U.S. CORPS OF ENGINEERS WETLAND DETERMINATION DATA FORMS

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# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Lu Residence - 13632 SE 37th Street City/County: Bellevue Sampling Date: Aug 21, 2018  
 Applicant/Owner: David Lu State: WA Sampling Point: S1  
 Investigator(s): J. Mallahan Section, Township, Range: S10, T24N, R05E  
 Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): ~0%  
 Subregion (LRR): LRR A Lat: 47.578137 Long: -122.156932 Datum: NAD83  
 Soil Map Unit Name: Arents, Everett material NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks:	

## VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5m <sup>2</sup> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A)  Total Number of Dominant Species Across All Strata: <u>1</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0%</u> (A/B)
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
_____ = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: OBL species _____ x 1 = <u>0</u> FACW species _____ x 2 = <u>0</u> FAC species _____ x 3 = <u>0</u> FACU species _____ x 4 = <u>0</u> UPL species _____ x 5 = <u>0</u> Column Totals: <u>0</u> (A) <u>0</u> (B)  Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: 3m <sup>2</sup> )				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				<b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Herb Stratum (Plot size: 1m <sup>2</sup> )				
1. Maintained yard grasses	99	Y	FACU	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum _____				
Remarks:				
Vegetation is highly managed. Wetland determination made based on soil and hydrologic conditions observed.				

## SOIL

Sampling Point: S1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features			Loc <sup>2</sup>	Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>			
0-2	10YR 3/2	100	-	-	-	-	SaLo	
2-9	10YR 3/3	100	-	-	-	-	SaLo	
9-16	10YR 3/4	100	-	-	-	-	SaLo	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

<sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                                  |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                              |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) ( <b>except MLRA 1</b> ) |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                          |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                              |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                           |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Depleted Dark Surface (F7)                        |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox Depressions (F8)                            |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes ☐ No ☒

Remarks:

Fill material present

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- |  |  |
|--|--|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Water-Stained Leaves (B9) ( <b>except MLRA 1, 2, 4A, and 4B</b> ) |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Salt Crust (B11)  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                                       |
| <input type="checkbox"/> Water Marks (B1)                          | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)  |
| <input type="checkbox"/> Sediment Deposits (B2)                    | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)                     |
| <input type="checkbox"/> Drift Deposits (B3)                       | <input type="checkbox"/> Presence of Reduced Iron (C4)                                     |
| <input type="checkbox"/> Algal Mat or Crust (B4)                   | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)                        |
| <input type="checkbox"/> Iron Deposits (B5)                        | <input type="checkbox"/> Stunted or Stressed Plants (D1) ( <b>LRR A</b> )                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Other (Explain in Remarks)  |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) |  |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)   |  |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Water Table Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_

Saturation Present? Yes ☐ No ☒ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

**Wetland Hydrology Present?** Yes ☐ No ☒

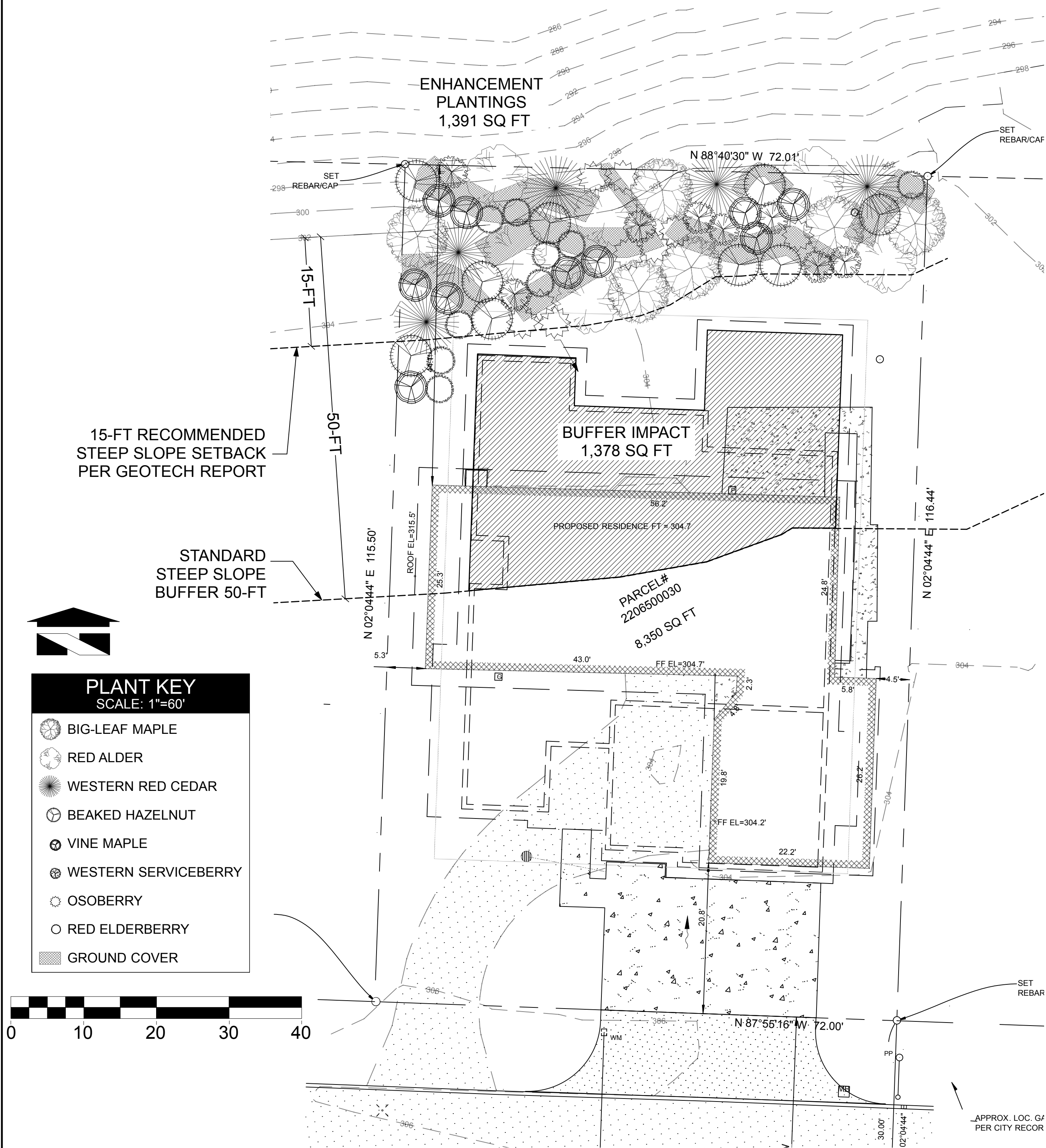
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# FINAL MITIGATION PLAN MAP

## Lu - SE 37th Street

PORTION OF SECTION 10, TOWNSHIP 24N, RANGE 05E, W.M.



### PROJECT DETAILS

The existing structure on the subject site will be demolished and a new primary residence will be constructed. The project area is located partially within the top-of-slope buffer of the adjacent steep slope area to the north.

Over fifty-percent of the subject property is completely encumbered by the 50-foot top of slope buffer. A strict adherence to the provisions of the Bellevue Land Use Code would have precluded any re-development on this parcel. Thus, the applicant requested a modification to the on-site steep slope buffer. No impacts shall occur to the steep slope areas.

The new construction has been designed according to recommendations by the geotechnical engineer. By implementing the design recommendations and construction techniques of the geotechnical engineer, the project will preserve the integrity of the on-site steep slope.

### Proposed Mitigation

Mitigation for the modification of the steep slope buffer will be provided through native vegetation enhancement between the proposed project and steep slope area to the north.

### BUFFER MITIGATION PLAN

The proposed SFR will impact 1,378 square feet of steep slope buffer area (including 779 sq ft of existing non-conforming development). In order to mitigate these impacts, a 1,391 square-foot buffer area between the proposed SFR and steep slope area to the north shall be enhanced. This mitigation plan not only mitigates for the new buffer impacts (399 sq ft), but also provides mitigation for the portion of the project located within the previously developed areas (existing house).

Table 1 - Steep Slope Buffer Impacts and Mitigation Summary

Impact Area (square feet)	Mitigation Type	Mitigation Area (square feet)	Mitigation Ratio
1,378	Enhancement	1,391	>1:1

### BUFFER ENHANCEMENT PLAN

The enhancement area is located along the top of slope just north of the project. The enhancement area currently consists of a sparsely vegetated landscaping and maintained lawn. Enhancement measures will result in improved slope stabilization and erosion control functions, higher plant cover/diversity, and potential wildlife habitat. A net gain in steep slope buffer functions will be obtained through this mitigation plan.

### Planting Plan

Maintained lawn in the enhancement area will be replaced with a diverse palette of native trees, shrubs, and groundcover. After planting, the entire enhancement area shall be stabilized with woodchip mulch (see *Planting Notes* for more detail). The following plant list represents recommended native species for site enhancement and aesthetic value. Native plant substitutions may occur based on Landscape Engineer recommendations, pursuant to consulting biologist or City Director approval.

Buffer Enhancement Area (1,391 square feet)

Common Name	Latin Name	Form	Min. Spacing	Quantity
Big-leaf maple	<i>Acer macrophyllum</i>	1-gallon pot	9' O.C.	6
Red alder	<i>Alnus rubra</i>	1-gallon pot	9' O.C.	6
Western red cedar	<i>Thuja plicata</i>	1-gallon pot	9' O.C.	5
Vine maple	<i>Acer circinatum</i>	1-gallon pot	4.5' O.C.	10
Beaked hazelnut	<i>Corylus cornuta</i>	1-gallon pot	6' O.C.	9
Western serviceberry	<i>Amelanchier alnifolia</i>	1-gallon pot	4.5' O.C.	9
Osoberry	<i>Oemleria cerasiformis</i>	1-gallon pot	4.5' O.C.	9
Red elderberry	<i>Sambucus racemosa</i>	1-gallon pot	4' O.C.	9
Kinnikinnick	<i>Arctostaphylos uva-ursi</i>	4-inch pot	2' O.C.	95
Wild ginger	<i>Asarum caudatum</i>	4-inch pot	2' O.C.	95
Western sword fern	<i>Polystichum munitum</i>	4-inch pot	2' O.C.	95

### PLANTING NOTES

Plant between late fall and early spring and obtain all plants from a reputable nursery. Care and handling of all plant materials is extremely important to the overall success of the project. The origin of all plant materials specified in this plan shall be native plants, nursery grown in the Puget Sound region of Washington. Some species substitution may be allowed with agreement of the contracted ecologist.

### Timing

Unless timing restrictions are established by the director for this project, all work shall be completed prior to final building inspection or issuance of a temporary certificate of occupancy or certificate of occupancy, as applicable for the development.

### Pre-Planting Meeting

Prior to control of invasive species or installation of mitigation plantings, a site meeting between the contracted landscaper and the consulting ecologist may occur to resolve any questions that may arise. During this meeting a discussion regarding plant spacing and proper locations of plant species will occur, as well as an inspection of the plants prior to planting. Minor adjustments to the original design may be required prior to and during construction.

### Handling

Plants shall be handled so as to avoid all damage, including: breaking, bruising, root damage, sunburn, drying, freezing or other injury. Plants must be covered during transport. Plants shall not be bound with wire or rope in a manner that could damage branches. Protect plant roots with shade and wet soil in the time period between delivery and installation. Do not lift container stock by trunks, stems, or tops. Do not remove from containers until ready to plant. Water all plants as necessary to keep moisture levels appropriate to the species horticultural requirements. Plants shall not be allowed to dry out. All plants shall be watered thoroughly immediately upon installation. Soak all containerized plants thoroughly prior to installation.

### Storage

Plants stored by the Permittee for longer than one month prior to planting shall be planted in nursery rows and treated in a manner suitable to those species' horticultural requirements. Plants must be re-inspected by the landscape architect prior to installation.

### Damaged plants

Damaged, dried out, or otherwise mishandled plants will be rejected at installation inspection. All rejected plants shall be immediately removed from the site, and properly replaced.

### Plant Names

Plant names shall comply with those generally accepted in the native plant nursery trade. Any question regarding plant species or variety shall be referred to the landscape architect or consulting ecologist. All plant materials shall be true to species and variety and legibly tagged.

### Quality and condition

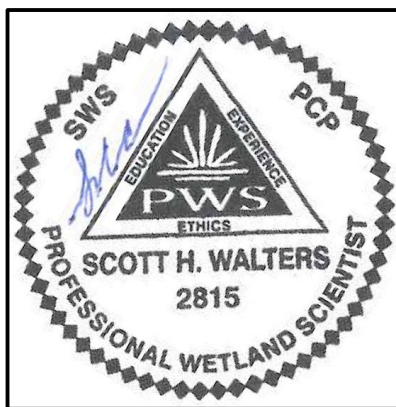
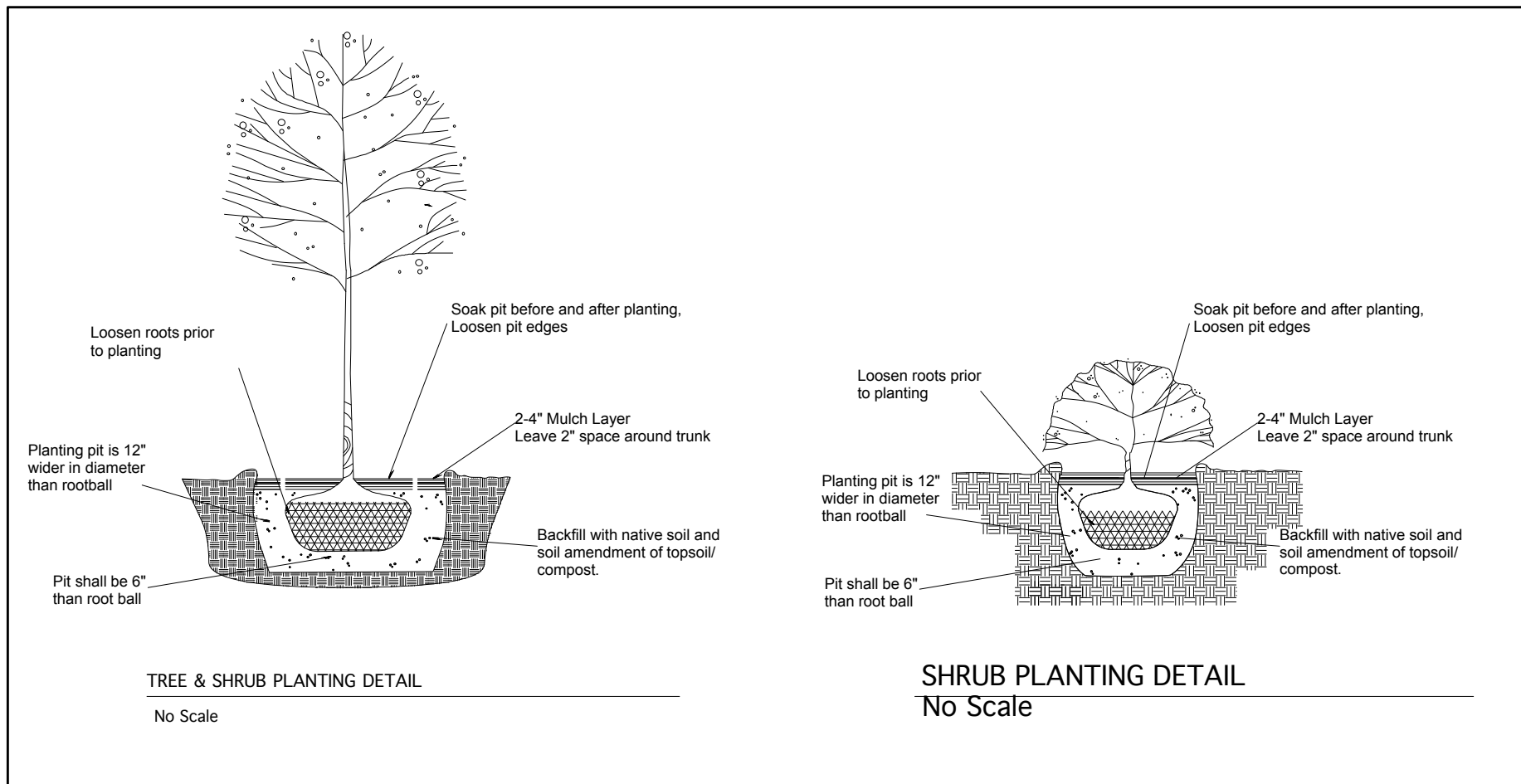
Plants shall be normal in pattern of growth, healthy, well-branched, vigorous, with well-developed root systems, and free of pests and diseases. Damaged, diseased, pest-infested, scraped, bruised, dried out, burned, broken, or defective plants will be rejected. Plants with pruning wounds over 1" in diameter will be rejected.

### Roots

All plants shall be balled and burlapped (B&B) or containerized, unless explicitly authorized by the landscape architect and/or consulting ecologist. Rootbound plants or B&B plants with damaged, cracked, or loose rootballs (major damage) will be rejected. Immediately before installation, plants with minor root damage must be root-pruned. Matted or circling roots of containerized plantings must be pruned or straightened and the sides of the root ball must be roughened from top to bottom to a depth of at least an inch.

### Sizes

Plant sizes shall be the size indicated in the plant schedule in approved plans, unless approved by the landscape architect or consulting ecologist. Larger stock may be acceptable provided that it has not been cut back to the size specified, and that the root ball is proportionate to the size of the plant. Smaller stock may be acceptable, and preferable under some circumstances, based on site-specific conditions. Measurements, caliper, branching, and balling and burlapping shall conform to the American Standard of Nursery Stock by the American Association of Nurserymen (latest edition).



JOB # 18270

SCALE 1" = 10'

Drawn By: S. Walters

Date: May 2, 2019

**WETLAND RESOURCES, INC.**  
2505 19TH AVENUE SE, SUITE 100  
EVERETT, WASHINGTON 98208  
425.337.3734 mailbox@wetlandresources.com

PREPARED FOR:  
David Lu  
13414 SE 85th Street  
Bellevue, WA 98006

FINAL MITIGATION PLAN

**LU - SE 37TH STREET**

BELLEVUE, WASHINGTON

SHEET

1/2

FINAL MITIGATION PLAN MAP

Lu - SE 37th Street

PORTION OF SECTION 10, TOWNSHIP 24N, RANGE 05E, W.M.

PLANTING NOTES CONTINUED

*Form*  
Evergreen trees shall have single trunks and symmetrical, well-developed form. Deciduous trees shall be single trunked unless specified as multi-stem in the plant schedule. Shrubs shall have multiple stems and be well-branched.

*Timing of Planting*  
Unless otherwise approved by the landscape designer/consulting ecologist, all planting shall occur between October 1 and March 1. Overall, the earlier the plants go into the ground during the dormant period, the more time they have to adapt to the site and extend their root systems before the water demands of summer.

*Weeding*  
Non-native, invasive vegetation in the mitigation area will be hand-weeded from around all installed plants at the time of installation and on a routine basis throughout the monitoring period. No chemical control of vegetation on any portion of the site is recommended without prior approval from the City and consulting ecologist.

*Site conditions*  
The landscaping contractor shall immediately notify the landscape designer and/or consulting ecologist of drainage or soil conditions likely to be detrimental to the growth or survival of plants. Planting operations shall not be conducted under the following conditions: freezing weather, when the ground is frozen, excessively wet weather, excessively windy weather, or in excessive heat.

*Planting Pits*  
Planting pits shall be circular or square with vertical sides, and shall be at least 12" wider in diameter than the root ball of the plant. Break up the sides of the pit in compacted soils. Set plants upright in pits. All burlap shall be removed from the planting pit/rootball. Backfill of native soils shall be worked back into holes such that air pockets are removed without adversely compacting soils.

*Fertilizer*  
Slow release fertilizer may be used if pre-approved by the landscape architect and consulting ecologist. Fertilizers shall be applied only at the base of plantings underneath the required covering of mulch (that does not make contact with stems of the plants). No fertilizers shall be placed within planting holes.

*Support Staking*  
Most shrubs and many trees DO NOT require any staking. If the plant can stand alone without staking in a moderate wind, do not use a stake. If the plant needs support, then strapping or webbing should be used as low as possible on the trunk to loosely brace the tree with two stakes. Do not brace the tree tightly or too high on the trunk. If the tree is unable to sway, it will further lose the ability to support itself. Do not use wire in a rubber hose for strapping as it exerts too much pressure on the bark. As soon as supporting the plant becomes unnecessary, remove the stakes. All stakes must be removed within two (2) years of installation.

*Arrangement and Spacing*  
The plants shall be arranged in a pattern with the appropriate numbers, sizes, species, and distribution that are required in accordance with the approved plans. The actual placement of individual plants shall mimic natural, asymmetric vegetation patterns found on similar undisturbed sites in the area. Spacing of the plantings may be adjusted to maintain existing vegetation with the agreement of the landscape designer and/or consulting ecologist.

*Mulching*  
Mulch (woodchip/arborist) shall be applied to the entire enhancement area after plant installation. Mulch shall be no less than 3 inches deep, and shall be kept 2 inches away from the trunks/stems of installed plants to prevent damage.

*Erosion and Sediment Control Plan*  
An erosion control and sediment plan will be submitted with the building permit application. All applicable TESC measures shall be installed before project work commences.

MAINTENANCE PROGRAM

The planting areas will require periodic maintenance to remove undesirable species and replace vegetation mortality. Maintenance shall occur twice a year for the 5-year monitoring period in accordance with the approved plan. Maintenance may include, but will not be limited to, removal of competing grasses, irrigation, replacement of plant mortality, and the replacement of mulch for each maintenance period. The Applicant is responsible for maintenance in all monitoring years.

*Duration and Extent*  
In order to achieve performance standards, the Permittee shall have the planting area maintained for the duration of the five-year monitoring period. Maintenance will include: watering, weeding around the base of installed plants, pruning, replacement, re-staking, removal of all classes of noxious weeds (see Washington State Noxious Weeds List), and any other measures needed to insure plant survival.

*Survival*  
The Permittee shall be responsible for the health of 100 percent of all newly installed plants for *one growing season* after installation has been accepted by the City. A growing season for these purposes is defined as occurring from spring to spring (March 15 to March 15 of the following year). For fall installation (often required), the growing season will begin the following spring. The Permittee shall replace any plants that are failing, weak, defective in manner of growth, or dead during this growing season.

*Installation Timing for Replacement Plants*  
Replacement plants shall be installed between October 1 and March 1, unless otherwise determined by the landscape designer and/or City staff.

*Standards for Replacement Plants*  
Replacement plants shall meet the same standards for size and type as those specified for the original installation unless otherwise directed by the landscape designer, consulting ecologist, and/or City staff.

*Mulch*  
All plantings will have mulch reapplied at their bases for at least the first two growing years of the monitoring period. Plants shall receive no less than 3 inches of wood chips (a.k.a. arborist mulch). Mulch shall be kept well away (at least 2 inches) from the trunks and stems of woody plants.

*Herbicides/Pesticides*  
Chemical controls shall not be used in the planting area, sensitive areas, or their buffers. However, limited use of herbicides may be approved depending on site-specific conditions, only if approved by City staff and the consulting ecologist.

*Watering/Irrigation*  
Water should be provided during the dry season (~July 1 through September 15) to insure plant survival and establishment. Water should be applied at a rate of one inch of water twice per week during the dry season. The landscaping contractor will determine if additional watering is necessary.

**CONTINGENCY PLAN**  
If, during any of the annual inspections, performance standards are not being met for species survival, additional plants of the same species will be added to the mitigation area. If invasive, non-native species exceed 5 percent cover (as measured by areal cover), manual control shall occur. If any of these situations persist to the next inspection, a meeting with the landscape designer/consulting ecologist and the Permittee will be held to decide upon contingency plans. Elements of a contingency plan may include, but will not be limited to: more aggressive weed control, mulching, replanting with larger plant material, species substitution, fertilization, soil amendments, and/or irrigation.

MITIGATION GOALS AND OBJECTIVES

The goal of this mitigation plan is to improve the functions of the steep slope buffer, and further protect the on-site steep slope from on-going residential uses. The specific goals of the plan are to increase vegetative species diversity and cover, increase browsing and cover opportunities for wildlife, increase soil stabilization capacity, limit erosion, improve the bio-filtration capacity of the buffer, and decrease invasive and non-native plant cover without harming steep slope areas.

To achieve the goals previously stated, non-native plants will be carefully removed from the steep slope buffer, and diverse native vegetation will be installed. Installed vegetation will be of high value to wildlife, thicket-forming, form wide-spreading and complex root structure, and will densely cover the ground surface.

Over time, this mitigation project is expected to achieve a net-gain in functions to wildlife, water quality, hydrology, erosion capacity, and soil stability within the buffer area, and is expected to better protect the on-site steep slope.

**PROJECT MONITORING PROGRAM**  
Monitoring shall be conducted annually for five years in accordance with the approved Buffer Mitigation Plan.

Requirements for monitoring project:  
1. Initial compliance report/as-built map  
2. Annual site inspection (once per year) for five years  
3. Annual reports including final report (one report submitted in the fall of each monitored year)

*Purpose for Monitoring*  
The purpose for monitoring shall be to evaluate the project's success. Success will be determined if monitoring shows at the end of five years that the definitions of success stated below are being met. Access shall be granted to the planting area for inspection and maintenance to the contracted landscaper and/or ecologist and the City during the monitoring period or until the project is evaluated as successful.

*Vegetation Monitoring*  
Vegetation monitoring data shall be collected throughout the mitigation site, and detail groundcover, shrub, and tree coverage and species survival. At least two photo points will be established, from which photos of the mitigation site shall be taken throughout the monitoring period. Photo point locations and directions must be identified on the as-built map (may be hand drawn on approved maps/plans). Vegetation monitoring shall occur annually between August 1 and September 30 (prior to leaf drop), unless otherwise specified.

**Monitoring Reports**  
Monitoring reports shall be submitted by December 31 of each year during the monitoring period. As applicable, monitoring reports must include descriptions/data for:

- (1) Site plan and vicinity map;
- (2) Historic description of project, including date of installation, current year of monitoring, restatement of planting/restoration goals, and performance standards;
- (3) Plant survival, vigor, and areal coverage for every plant stratum (sampling point data), and explanation of monitoring methodology in the context of assessing performance standards;
- (4) Slope condition and site stability;
- (5) Overall buffer conditions, e.g., surrounding land use, use by humans and/or wildlife;
- (6) Observed wildlife, including amphibian, avian, and others;
- (7) Assessment of invasive biota and recommendations for management;
- (8) Color photographs taken from permanent photo points that shall be depicted on the monitoring report map.

**Project Success and Compliance**  
Upon installation and completion of the approved mitigation plan, an inspection by a qualified ecologist and/or City will be made to determine plan compliance. A compliance report will be supplied to the City of Bellevue within 30 days of the completion of planting. The Applicant or consulting ecologist/landscape designer will perform condition monitoring of the plantings before October of each year for five years. A written report describing the monitoring results will be submitted to the City after each site inspection of each monitored year, submitted no later than December 31st of each monitored year. Final inspection will occur five years after completion of this project, and a report on overall project its success will be prepared.

*Performance Standards*  
Project success will be measured by native species survival and richness, and areal cover of native and invasive plants. The mitigation area must achieve the following Performance Standards to be considered successful:

	Year 1	Year 3	Year5
<b>Native Plant Survival</b>	100%	90%	80%
<b>Invasive/Non-native species cover</b>	<5%	<5%	<5%
<b>Species Richness (# species present)</b>	9	8	8

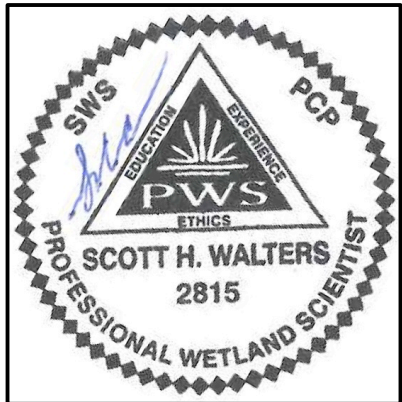
*Assurance Device*  
The City of Bellevue may require a performance or maintenance assurance device if it is determined to be necessary. The City will determine the type and amount of assurance device required. The performance or maintenance assurance device amount is typically determined from the estimated cost of work. An estimate of the cost of project installation is provided below.

Cost of Plants and Labor	\$2,149.50
1-gal pots (\$11.50 per plant)= 63	
4-inch pots (\$5 per plant)= 285	
Cost of Silt Fence (\$1.60/linear foot)	\$132.80
Cost of Mulch (\$3.25/sq.yd.)	\$500.00
TOTAL ESTIMATED COST	\$2,782.30

FINAL MITIGATION PLAN

LU - SE 37TH STREET

BELLEVUE, WASHINGTON



Drawn By: S. Walters  
Date: May 2, 2019

JOB # 18270

SCALE 1" = 10'

WETLAND RESOURCES, INC.  
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